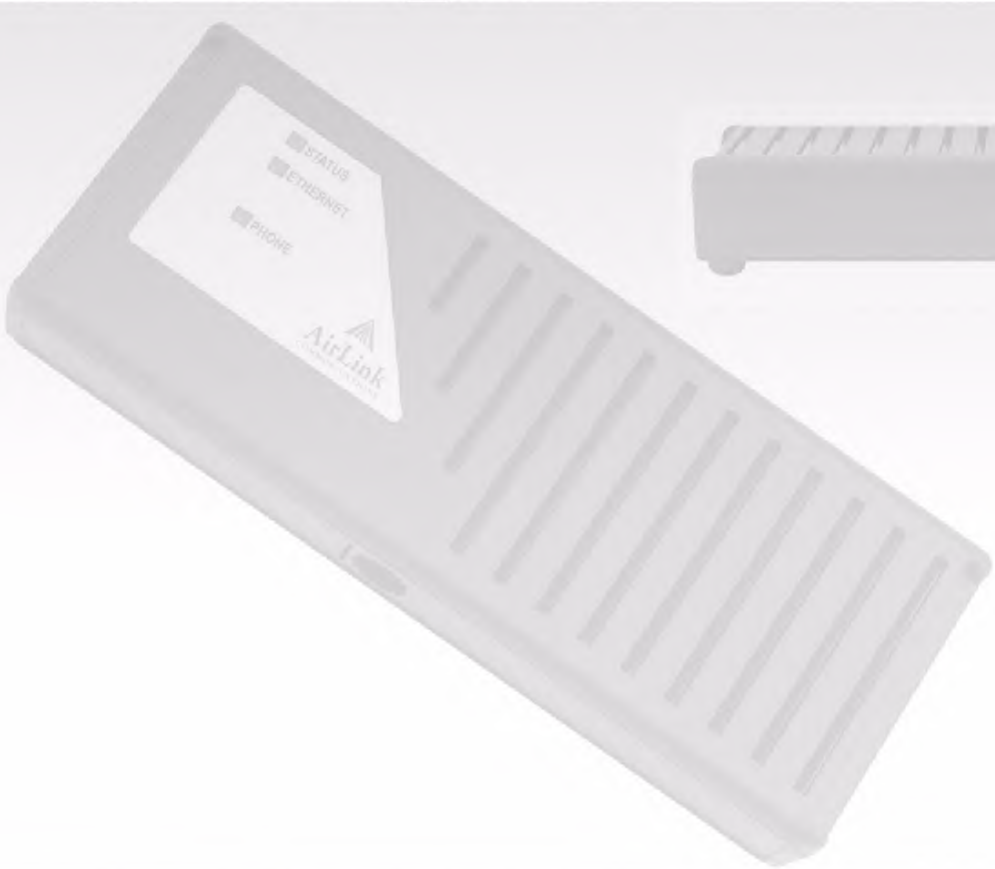
AirLink
COMMUNICATIONS

# Host RJ-11 IP Gateway

## User Guide



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CHAPTER 1

# Introduction

Many existing meters, data loggers, RTU's, PLC's, point-of-sale, and other remote devices only have physical interfaces designed to access the telephone network. They do not have serial or Ethernet ports. They currently use analog cellular or standard phone lines to connect in circuit-switched mode for data transfer.

Analog cellular phone service is being discontinued. The combination of the Host RJ-11 IP Gateway, RJ-11 IP Gateway, and the AirLink Raven-E enables remote connectivity between host applications and these remote devices over cellular packet data networks. The RJ-11 IP Gateway provides the bridge between a device requiring an RJ-11 interface and the Raven-E, with its Ethernet interface. The Host RJ-11 IP Gateway can provide Ethernet-based Internet connectivity to a Legacy Host system with only RJ-11 ports.

**FIGURE 1. Host RJ-11 Ethernet Connectivity for a Legacy Host**

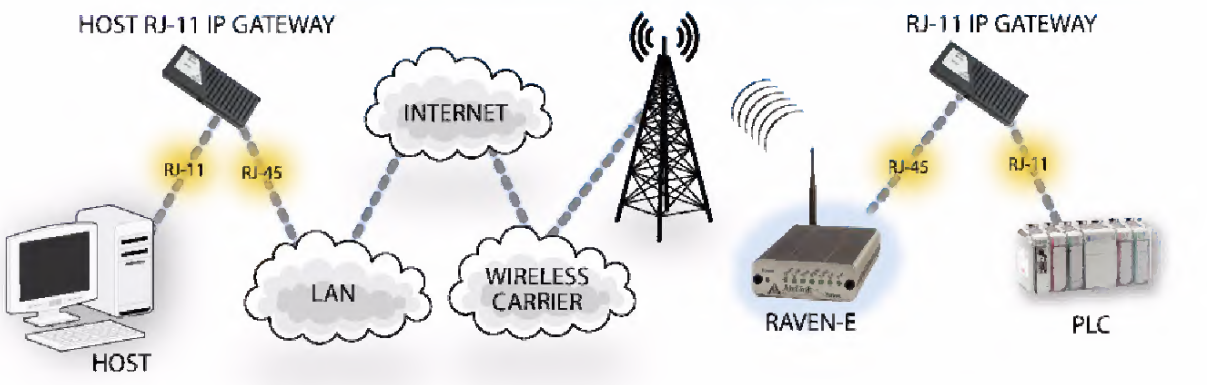




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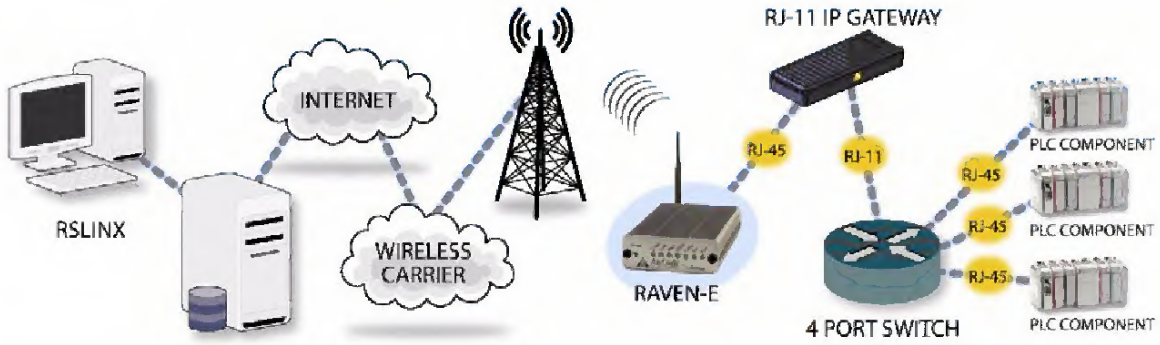
FIGURE 2. **Host RJ-11 Gateway with an AirLink Raven-E and a Modem Router**




## Host RJ-11 IP Gateway Features

- **One RJ-11 phone port**

  The phone port is a phone line designed to function just like standard wall-jack analog phone line. It is designed primarily to connect dial-up devices, with internal modems, to the RJ-11 IP Gateway, which then routes data from the devices over the network. The RJ-11 IP Gateway and Host RJ-11 IP Gateway mimics the phone company, answering incoming calls and routing them to an internal modem attached to the phone port, or generating calls from an internal modem to an attached device.

  **Caution:** The Host RJ-11 IP Gateway's RJ-11 phone port should never be connected into the Public Switched Telephone Network (PSTN). This device is designed to emulate the PSTN for other devices. The Host RJ-11 IP Gateway may sustain damage not covered by warranty if it is connected to the Public Switched Telephone Network.

- **One RJ-45 auto-sensing 10base-T Ethernet port**

  The Ethernet port is designed to be connected to either an AirLink modem with an Ethernet port such as the Raven-E or Raven X or any Etbernet-based network. With the modem connected to the cellular network, the communication from the device connected to the RJ-11 port can be routed to the Internet and your remote host.

- **One power connector**

  The Host RJ-11 IP Gateway uses a AC power adapter with an optional DC adapter available.

- **Status LEDs**

  The Host RJ-11 IP Gateway status LEDs give clear and concise information about the operation of the ports.



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CHAPTER 2

# Installation

Configuring the Host RJ-11 IP Gateway to work with your network or Raven-E and your RJ-11 equipped device is easy. This chapter covers a hasic configuration.

**Caution:** The Host RJ-11 IP Gateway's RJ-11 port (labeled "Phone") should not be connected into the Public Switched Telephone Network. This port is the emulation for a Phone that you would have been using with your device. The RJ-11 IP Gateway will sustain damage not covered by warranty if it is connected to the Public Switched Telephone Network.

## Before You Start

**Caution:** If the Host RJ-11 IP Gateway and Raven-E (as applicable) are going to he on a hub which is connected to a local network, you will need to be sure the addresses you select are not used by any other device on the network. Consult with your network administrator if you are unsure.

### Software Required

- **Wireless Ace** - Graphical interface for configuring your Raven-E. Wireless Ace is located on Host RJ-11 IP Gateway CD or you can download Wireless Ace from the AirLink website: http://www.airlink.com/support/modems/utilities/. A default installation of this utility is assumed later in these directions.

  If you *will not* be connecting the Host RJ-11 IP Gateway to a Raven-E, you *will not* need Wireless Ace.

- **Host RJ-11 IP Gateway Port Utility** - Utility to establish an initial IP address for your Host RJ-11 IP Gateway. The port utility is located on the Host RJ-11 IP Gateway CD or you can download it from the AirLink website: http://www.airlink.com/support/modems/rj-11-host.asp. A default installation of this utility is assumed later in these directions.

  If you *will* be connecting the Host RJ-11 IP Gateway to a Raven-E, you *will not* need the port utility. If you can use the default IP address of the Host RJ-11 IP Gateway for the initial configuration, you, also, *will not* need the port utility.

### Hardware Required

- **Ethernet Cable** - A cross-over or straight through Ethernet cahle.



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If you will be connecting the Host RJ-11 IP Gateway to a Raven-E, you will need a cross-over Ethernet cable to configure your Raven-E unless your computer's Ethernet port is auto-sensing.

The Host RJ-11 IP Gateway has an auto-sensing Ethernet port, you can use either a cross-over cable or a straight-through Ethernet cable to connect the Host RJ-11 IP Gateway to the Raven-E or your computer.

- **Power supplies and a power source** - You will need a power supply and power source for both the Host RJ-11 IP Gateway and the Raven-E (as applicable).
- **PC or Laptop** - To configure both the Host RJ-11 IP Gateway and the modem (as applicable), you will need a computer with Internet Access, other than the cellular account, and an available Ethernet port.

### Cellular Account Required

- **Cellular Account** - If you will be connecting the Host RJ-11 IP Gateway to a Raven-E, you need to already bave an active account with a cellular provider and to have activated your modem with tbat provider. The AirLink Raven-E is certified to work with a variety of cellular providers.

  If you need to activate your modem, you can use the Setup Wizard for your cellular provider which you can obtain from the AirLink website: http://www.airlink.com/support/.

### Important Information about Ports

- **Port Blocking** - Many cellular providers and other ISPs block ports below 1024 which are the default ports for many server protocols (such as HTTP, telnet, and SSH). If your provider blocks these ports, you will need to configure a port you can access.

## Configuring your Raven-E for the Host RJ-11 IP Gateway

These steps are just a basic configuration to get you started and allow the Raven-E to connect with the Host RJ-11 IP Gateway. Refer to the modem user guide for more configuration options for specific environments.

Omit this section if you are not connecting your Host RJ-11 IP Gateway to a Raven-E.

### Default settings

- Management Interface IP Address: **192.168.13.31**.
- Telnet and Wireless Ace password: **12345**
- **DHCP** server: **enabled**.
- **Public Mode** - the IP Address assigned by the carrier is assigned to the Host RJ-11 IP Gateway.

**Note:** If you are intending to use the Host RJ-11 IP Gateway default IP Address of 192.168.1.3, you will need to change the default configuration of the Raven-E.



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## Configuring the Raven-E

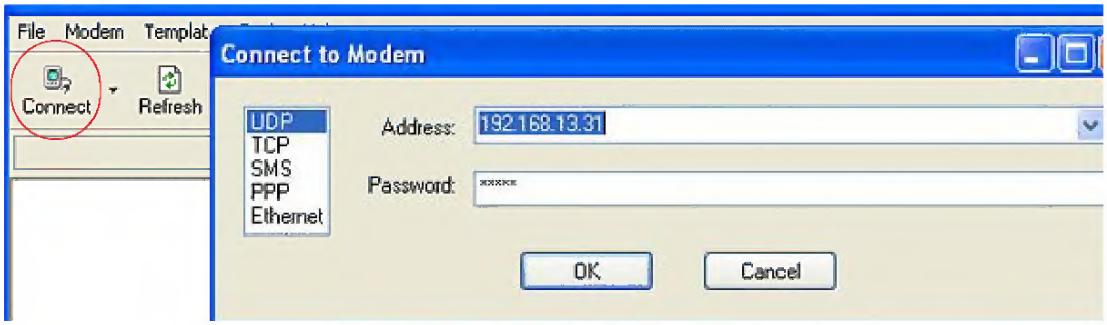
1. Connect your Raven-E directly to the Ethernet port on your computer and to power.

2. Start **Wireless Ace** and connect to your modem.

   Start > All Programs > AirLink Communications > Wireless Ace 3G > Wireless Ace 3G

   A. Click on **Connect**.
   B. Select **UDP**.
   C. Type in the modem's local IP (default is ***192.168.13.31***).
   D. Type in the modem's password (default ***12345***)

**FIGURE 1. Wireless Ace: Connect**

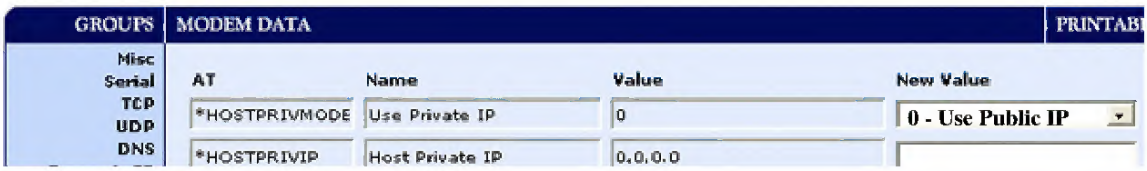



3. Select **PPP/Ethernet** from the menu on the left side of Wireless Ace (under "Groups").

### *Public Mode*

Configure the Raven-E for Puhlic Mode. Set the ***HOSTPRIVMODE** to **0**. In this mode, the modem assigns the Host RJ-11 IP Gateway the IP address it has received from your cellular provider. This is the default setting for the modem.

**FIGURE 2. Wireless Ace: PPP/Ethernet**




**Note:** The Host RJ-11 IP Gateway is set to a default static IP address of 192.168.1.3, if you want to keep that IP address for the Host RJ-11 IP Gateway, use Puhlic Mode to set the static IP address for the modem and gateway..



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### *Private Mode*

Configure the Raven-E for Private Mode. In this mode, the modem communicates with the Host RJ-11 IP Gateway via a static local IP address.

If the modem and the Host RJ-11 IP Gateway are going to be on a LAN with other computers and devices you may want to use Private Mode. On a LAN, a DHCP server other than the modem may give the Host RJ-11 IP Gateway an IP address to which the modem would not know to send its messages.

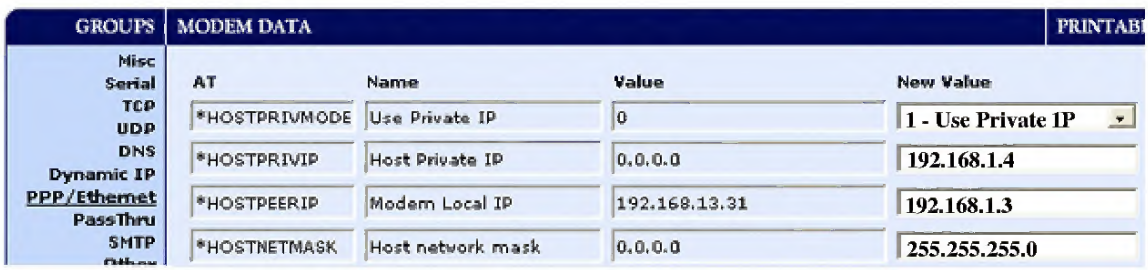
a. Set the ***HOSTPRIVMODE** to **1**.

b. Set the ***HOSTPRIVIP** to the IP address for the Host RJ-11 IP Gateway (in the example, **192.168.1.4**).

c. Verify the ***HOSTPEERIP** is the local IP of the modem. Set this to **192.168.1.3** if you are keeping the default IP address for the Host RJ-11 IP Gateway.

d. Set the ***HOSTNETMASK** to the Subnet Mask (generally **255.255.255.0**).

**FIGURE 3. Wireless Ace: PPP/Ethernet**




**4.** When you have finished configuring the Ethernet settings, click the **Write** button on the tool bar of Wireless Ace and wait for the message "Write Successful" to appear in the status bar.

**FIGURE 4. Wireless Ace: Write**

**5.** Note the IP address given to the modem hy your cellular provider.

A. Select **Status** from the menu on the left side of Wireless Ace (under "Groups").



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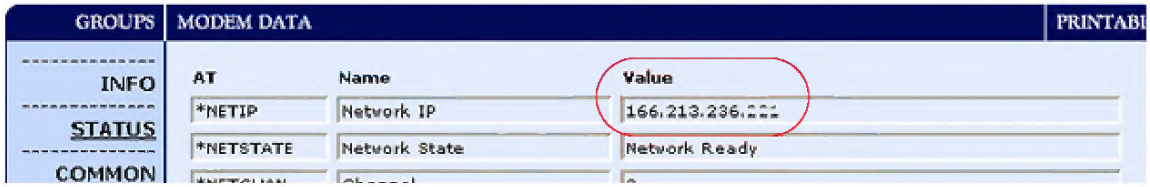
FIGURE 5. **Wireless Ace: Status**




B. Note the IP address listed in the Value column for the command ***NETIP**.

For ***NETSTATE**, "Network Ready" means your modem is connected on the cellular network and waiting for connections. "Network Dormant" means the modem is connected and waiting for connections but the connection has been idle. In either state, the modem is ready for the steps in the next section.

**6.** Disconnect your modem's Ethernet cable from your computer, but leave the modem connected to power so it remains on the cellular network.

## Configuring the Intial IP Address for the Host RJ-11 IP Gateway without a Raven-E

The configuration interface for the Host RJ-11 IP Gateway is web-based, to he able to access the interface you will need to connect the Host RJ-11 IP Gateway to a computer using Ethernet.

If you are using a Raven-E with the Host RJ-11 IP Gateway, you do not need to use this utility, skip this section.

If you are able to use the default IP address of the Host RJ-11 IP Gateway, you, also, do not need to use this utility.

**1.** Connect your Host RJ-11 IP Gateway directly to the Ethernet port on your computer and to power.

**2.** Start the **Port Utility**.

Start > All Programs > Systech Port Server Utilities

The Port Utility should automatically detect the Host RJ-11 IP Gateway. It may take a short while for the device to be displayed.



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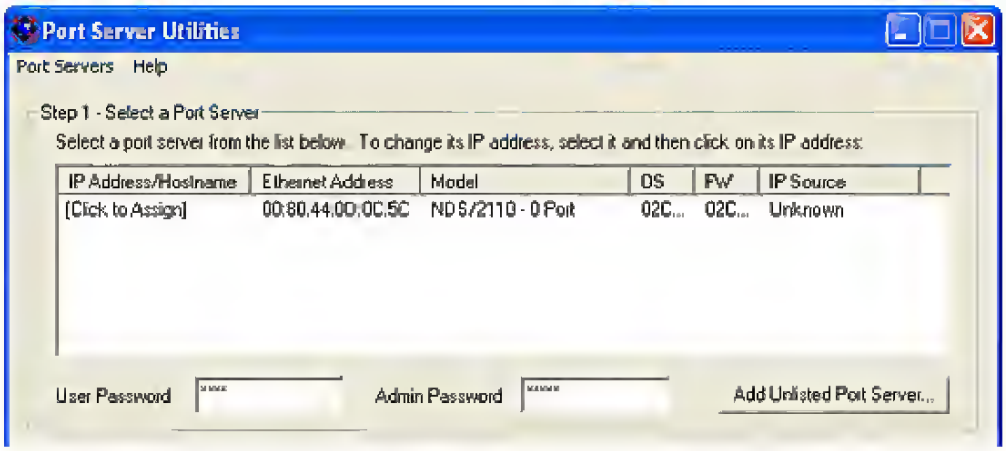
**FIGURE 6. Port Utility**




**3.** Configure a temporary IP address for configuring the Host RJ-11 IP Gateway.

A. Double-click on the **[Click to Assign]** for the discovered device (if an IP addess is listed in that column, double-click on the IP address if you need to change it).

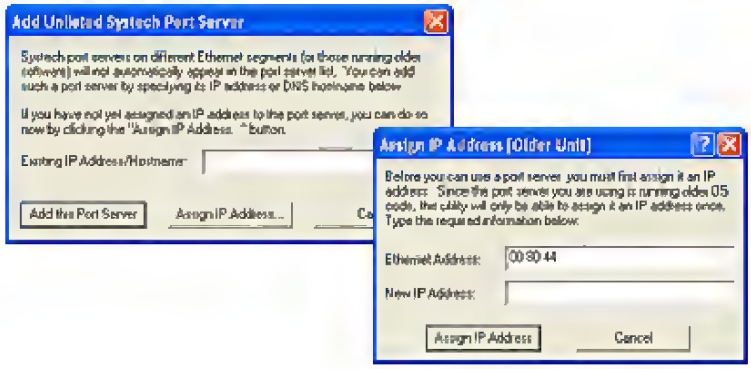
B. Type in an IP address. It's recomended that you use **192.168.1.3**.

C. Press Enter to save the address.

optional If the Host RJ-11 IP Gateway is not displayed in step 2, you will need to manually add the device.

A. Click on Add Unlisted Port Server.

**FIGURE 7. Add Unlitsed Port Server**




B. Click on **Assign IP Address**.

C. Enter the MAC address found on a sticker beside the Ethernet port on the **Ethernet Address** line.

D. Type in the desired IP Address as noted in step 3 above.

E. Click **Assign IP Address**.



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4. Temporarily change your computer to a static IP address to configure the Host RJ-11 IP Gateway.

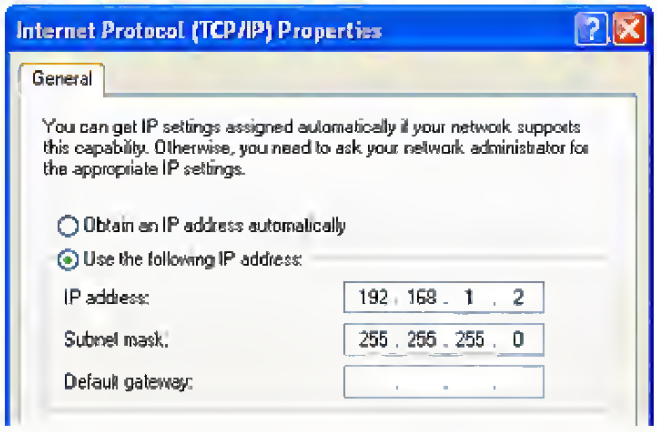
A. Open the properties for your network connection. Start>Control Panel>Network Connections, right-click on your local area connection, and select Properties.

**FIGURE 8. Local Area Connection**

B. Select **Internet Protocol (TCP/IP)** and click on **Properties**.

C. Note the current settings (so you can return to them when you finish).

**FIGURE 9. TCP/IP Properties**


Internet Protocol (TCP/IP) Properties
General
You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.
Obtain an IP address automatically
Use the following IP address:
IP address:
192 . 168 . 1 . 2
Subnet mask:
255 . 255 . 255 . 0
Default gateway:

D. Change the IP address to match the temporary IP address you configured for the Host RJ-11 IP Gateway. The last number needs to be different. If you configured 192.168.1.3 for the Host RJ-11 IP Gateway, you should use 192.168.1.2 for your computer.

E. Do not disconnnect your computer from the Host RJ-11 IP Gateway.

F. Follow the directions in the next section. Omit the first step and use the IP address you configured in this section for the IP address instead of one from the Raven-E.



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**Note:** When you have completed configuring the Host RJ-11 IP Gateway, you will want to reconfigure the IP address on your computer to how it was configured before you started these steps. Use the directions in this step to reset the configuration.

## Configuring the IP Address and Interface Port of the Host RJ-11 IP Gateway

### Host RJ-11 IP Gateway Defaults

- Phone port: **8 data bits**, **no parity**, and **1 stop bit** (8N1).
- Protocol: **American/Bell 212A**.
- Maximum baud: **2400**.
- **DHCP** client: **disabled**.
- IP Address: **192.168.1.3**.

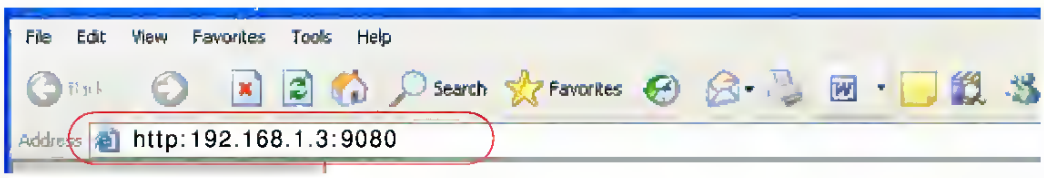
**Note:** If you are using the defaults for the Host RJ-11 IP Gateway, you can skip this section and connect your Host RJ-11 IP Gateway directly to your device and network.

### Configuring the Host RJ-11 IP Gateway

1. Connect the Host RJ-11 IP Gateway to power and connect the Ethernet cable from your computer to the Host RJ-11 IP Gateway.

2. Type "**http://192.168.1.3:9080**" (see the example in the screenshot below) in the **Address** or Location bar and press the enter key.

**FIGURE 10. Web Browser : Enter the Location**




Since many cellular carriers block the standard web browser ports (80 and 8080), the Host RJ-11 IP Gateway uses **9080** by default as the port for the web-based interface.

The web-based interface will open. On the left side of the window are menu options. The central area of the window is the working area (shown in the close up screen sbots for the configuration settings).



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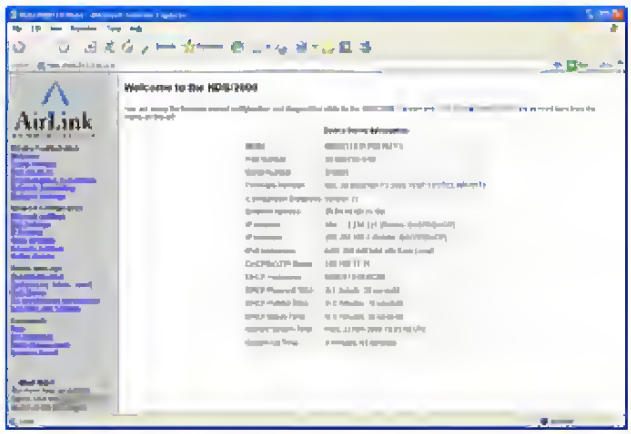
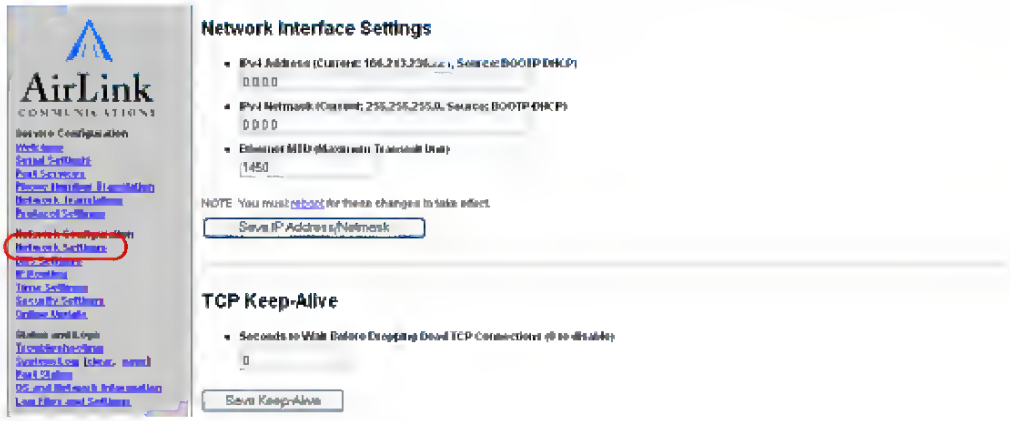
FIGURE 11. Host RJ-11 IP Gateway Interface



3. Select **Network Settings** from the menu on the left.

FIGURE 12. Host RJ-11 IP Gateway: Network Settings




### *DHCP Mode*

In DHCP Mode, the Host RJ-11 IP Gateway will receive its IP address from the modem.

The IPv4 Address and the IPv4 Netmask should be listed as **0.0.0.0**.



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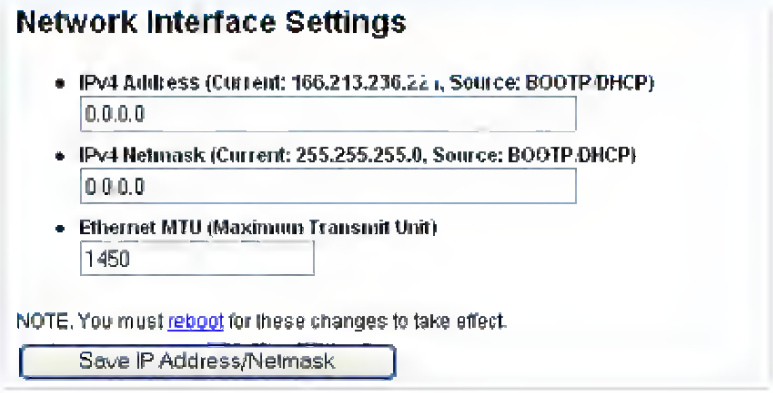
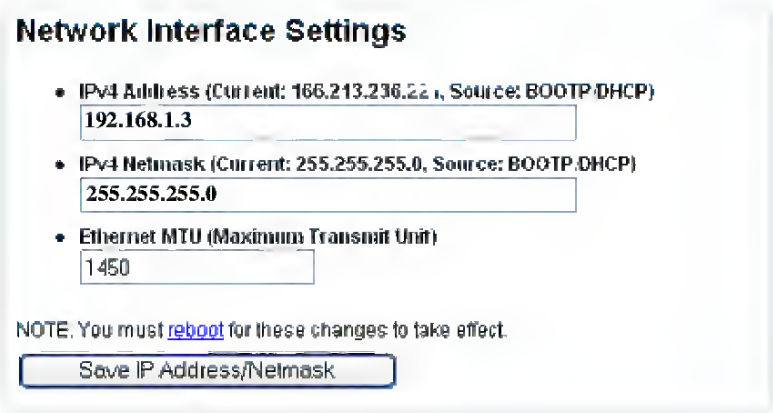
FIGURE 13. RJ-11 IP Gateway: Network Interface Settings


Network Interface Settings
IPv4 Address (Current: 166.213.236.22 , Source: BOOTP/DHCP)
0.0.0.0
IPv4 Netmask (Current: 255.255.255.0, Source: BOOTP/DHCP)
0.0.0.0
Ethernet MTU (Maximum Transmit Unit)
1450
NOTE. You must reboot for these changes to take effect.
Save IP Address/Netmask

*Static IP Mode*

If the Host RJ-11 IP Gateway is going to be on a LAN, you many wish to set a static IP address. Use this mode only if you have configured Private Mode for the modem. The default for the Host RJ-11 IP Gateway is a static IP address of **192.168.1.3**.

FIGURE 14. Host RJ-11 IP Gateway: Network Interface Settings


Network Interface Settings
IPv4 Address (Current: 166.213.236.22 , Source: BOOTP/DHCP)
192.168.1.3
IPv4 Netmask (Current: 255.255.255.0, Source: BOOTP/DHCP)
255.255.255.0
Ethernet MTU (Maximum Transmit Unit)
1450
NOTE. You must reboot for these changes to take effect.
Save IP Address/Netmask

A. Set the **IPV4 Address** to match the ***HOSTPRIVIP** in step 3 of the previous section.
B. Set the **IPV4 Netmask** to match the ***HOSTNETMASK** in step 3 of the previous section.
C. Click the **Save IP Address/Netmask** button.

4. Select **Serial Settings** from the menu on the left.

The Serial Settings page allows you to specify the baud rate, protocol, character size, parity, stop bits, and flow control behavior for the RJ-11 port (Phone).



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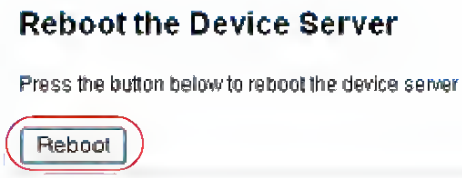
FIGURE 15. Host RJ-11 IP Gateway: Serial Settings

For more information on these settings, refer to page 21.

**Note:** For most configurations, the default settings are best. Change these parameters only if you know the device you will be connecting to the Host RJ-11 IP Gateway requires special settings.

5. Click on the **Reset/Reboot** menu option for the IP Address configuration and any changes to the serial port settings to take effect.

FIGURE 16. Host RJ-11 IP Gateway: Reset/Reboot




Click the **Reboot** button to restart the Host RJ-11 IP Gateway with the configured settings.



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CHAPTER 3

# Hardware

Designed for simplicity, the Host RJ-11 IP Gateway hardware has few complicated parts.

## Connectors and Reset button

The Reset button is recessed. To reset the connection, using an unbent paperclip or other narrow, blunt tip, press and quickly release the reset button. To reset the configuration to the factory default, press and hold the reset button until you see the appropriate alternating light sequence.

**FIGURE 1. Right side: RJ-45 connector, Power connector, and Reset button (not to scale)**

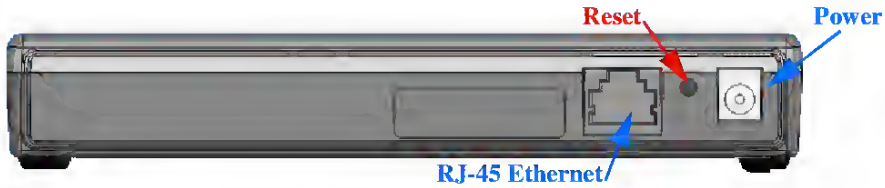
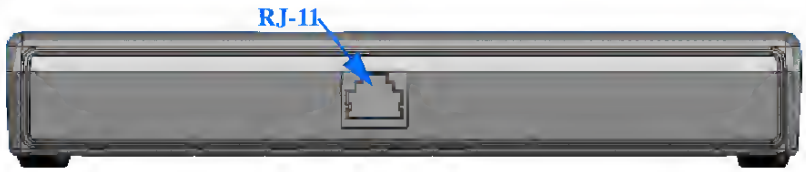



**FIGURE 2. Left side: RJ-11(phone) connector (not to scale)**




**Caution:** The Host RJ-11 IP Gateway's RJ-11 phone port should never be connected into the Public Switched Telephone Network (PSTN). This device is designed to emulate tbe PSTN for other devices. The Host RJ-11 IP Gateway may sustain damage not covered by warranty if it is connected to the Public Switched Telephone Network.

## Status LEDs

The top panel of the Host RJ-11 IP Gateway displays the status LEDs.



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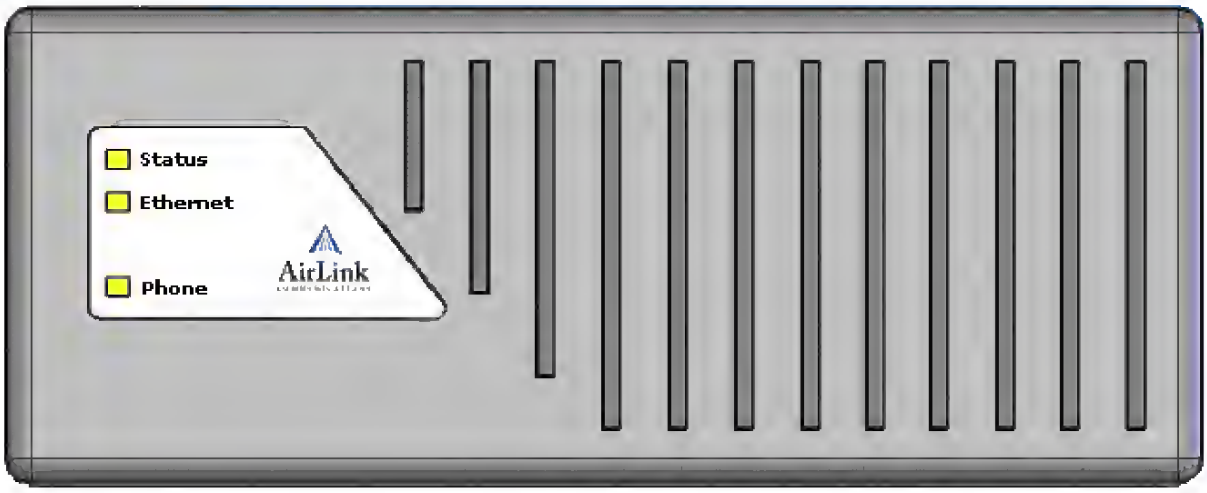
FIGURE 3. Host RJ-11 IP Gateway Top Panel (not to scale)




- **STATUS** - Indicates the overall status of the device.

TABLE 1. Status - Normal Operation

| LED Condition | Description |
|---|---|
| Blinking Yellow | The Host RJ-11 IP Gateway is starting up. |
| Solid Green | The Host RJ-11 IP Gateway is obtaining an IP address from the modem. |
| Blinking Green | The Host RJ-11 IP Gateway has an IP address and is operating normally. |
| Off | No power to the Host RJ-11 IP Gateway. |

TABLE 2. Status - Resetting the Configuration

| LED Condition | Description |
|---|---|
| Alternating Green/Red | While the Reset button is held in, the status light will begin to blink in this sequence to indicate the Host RJ-11 IP Gateway will shortly restore the factory default condition.<br>If you do not want to restore the factory default, release the button before the sequence changes to Green/Yellow. |
| Alternating Green/Yellow | While the Reset button is held in, the status light will begin to blink in this sequence to indicate the factory default configuration was restored. Once the Host RJ-11 IP Gateway indicates the configuration was restored, you can release the reset button. |

TABLE 3. Status - Error Conditions

| LED Condition | Description |
|---|---|
| Alternating Green/Red | A serious system error occurred. See the system log for more details. |



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**TABLE 3. Status - Error Conditions**

| | |
|---|---|
| Alternating Green/Yellow | The current configuration is corrupt and the factory default configuration is being used |
| Solid Red | The Host RJ-11 IP Gateway has encountered a fatal error, contact technical support for assistance. |

- **ETHERNET** - Indicates the status of the Ethernet connection (RJ-45 port).

**TABLE 4. Ethernet**

| LED Condition | Description |
|---|---|
| Solid Green | The Ethernet link is available and idle. |
| Green/Yellow Blinking | Network traffic is detected. |
| Off | The Ethernet link is unavailable. |

- **PHONE** - Indicates the status of the phone port (RJ-11).

**TABLE 5. Phone**

| LED Condition | Description |
|---|---|
| Solid Green | The port is open and idle. |
| Blinking Green | The port is open, and data is being transmitted or received. When data is being continuously transferred, this LED will blink approximately 2 times per second. |
| Blinking Red | Data errors will cause periodic red blinks. Persistent red blinks may imply a configuration problem (incorrect baud rate, parity settings, etc.) |
| Yellow | Port is closed. |
| Solid Red | Port hardware has failed. |
| Off | Power is off. |



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CHAPTER 4

# Configuration Settings and Commands

The Host RJ-11 IP Gateway can be configured to handle a variety of devices which need to connect to an RJ-11 port.

If you're using a Raven-E with the Host RJ-11 IP Gateway, for configuration options for your Raven-E, refer to the modems's user guide. All user guides are available on the AirLink website: http://www.airlink.com/support.

## Web-based Interface

**Note:** Screen shots in this guide are using Microsoft Internet Explorer, but you can use any web browser to configure the Host RJ-11 IP Gateway.

The Host RJ-11 IP Gateway employs a web-based user interface. To access the web interface, you will need to know the IP Address given to your Raven-E by the cellular carrier (or the modem domain name if you have configured IP Manager settings for the modem). Type the IP address (or modem domain name) into the Address bar of your web browser followed by "**:9080**" (see the example below).

Since many cellular carriers block the standard web browser ports (80 and 8080), the Host RJ-11 IP Gateway uses **9080** by default as a port for the web-based interface.

**FIGURE 1. Web Browser: Enter the Location**

The web interface for the Host RJ-11 IP Gateway, by default, has no security. If you made changes to the security configuration ("Security Settings" on page 29), you will be prompted for a user name and password before the web-based interface will open.

The menu selections for the configuration interface are on the left side of the window.



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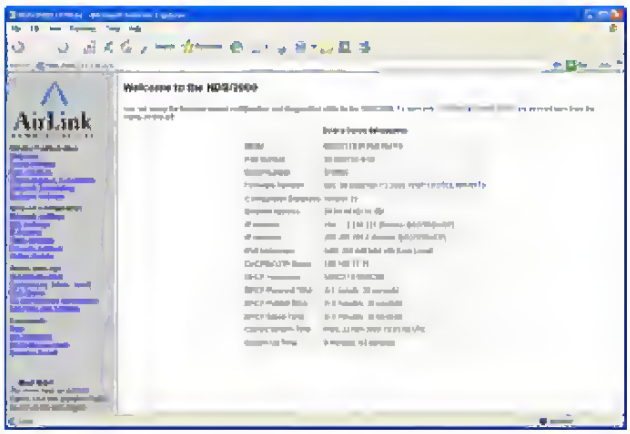
FIGURE 2. **Host RJ-11 IP Gateway Web Browser-based Interface**




## Service Configuration

Most of the Service Configuration menu options deal with the RJ-11 port.

### Welcome

The Welcome screen is the first page displayed when you connect to the Host RJ-11 IP Gateway. Current settings and status are shown in a table.

FIGURE 3. **Host RJ-11 IP Gateway: Welcome - Device Server Information**

**Device Server Information**

| | |
|---|---|
| Model | NDS/2110 (1 Port, RJ-11) |
| Part Number | 65-800753-4-00 |
| Serial Number | 518089 |
| Firmware Revision | 02C.28 (built Nov 13 2006 19:07:13 UTC), HPI-8173 |
| Configuration Database | Version 23 |
| Ethernet Address | 00:80:44:0D:0C:8B |
| IP Address | 166.213.236.221 (Source: BOOTP/DHCP) |
| IP Netmask | 255.255.255.0 (Source: BOOTP/DHCP) |
| IPv6 Addresses | fe80::280:44ff:fe0d:c8b (Link Local) |
| DHCP/BOOTP Server | 192.168.13.31 |
| DHCP Hostname | NDS2110-0D0C8B |
| DHCP Renewal Time | in 1 minute, 30 seconds |
| DHCP Rebind Time | in 2 minutes, 30 seconds |
| DHCP Expire Time | in 3 minutes, 30 seconds |
| Current System Time | Wed, 22 Nov 2006 16:03:42 UTC |
| System Up Time | 6 minutes, 43 seconds |



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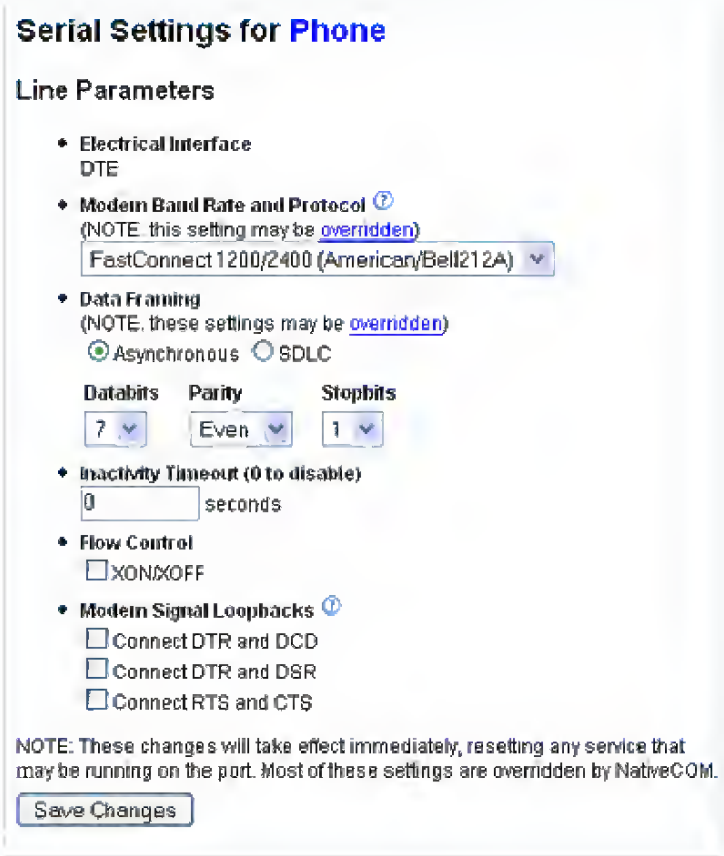
- **Ethernet Address:** MAC Address of the Host RJ-11 IP Gateway.
- **IP Address:** The current IP Address of the Host RJ-11 IP Gateway and how the IP address was assigned (in the example, a Raven-E in Public Mode used DHCP to give the Host RJ-11 IP Gateway the IP addressed assigned by the cellular network).
- **IP Netmask:** The current subnetmask of the Host RJ-11 IP Gateway and how the device obtained it.

### Serial Settings

The Serial Settings page allows you to specify the baud rate, protocol, character size, parity, stop bits, and flow control behavior for the RJ-11 port (Phone).

**Note:** For most configurations, the default settings (shown in the screen shots) are best. Change these parameters only if you know the device you will be connecting to the Host RJ-11 IP Gateway requires special settings.

**FIGURE 4. Host RJ-11 IP Gateway: Serial Settings**




- Enabling flow control enables it on hoth input and output.
- The inactivity time-out shuts down the service on the port if there is no input or output in the specified time-out period.



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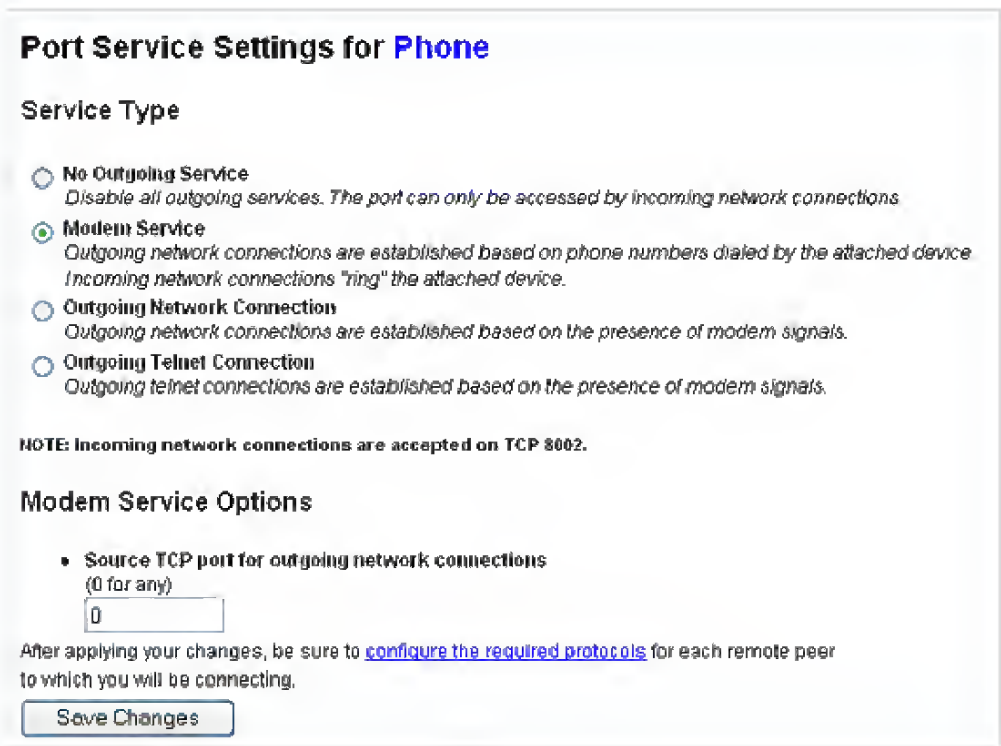
- With Modem Signal Loopbacks, tbe Host RJ-11 IP Gateway eliminates the use of specialized cables required to change signal types and directions by performing tbe loopback of signal types to other signal types internally.
- NativeCOM, (or any RFC-2217 Telnet client with COM-PORT-OPTION support) overrides the baud rate, size, parity, stop bits and flow control parameters.

### Port Services

By default, the RJ-11 port is configured to accept incoming TCP connections from TCP/telnet clients with outgoing service based on phone numbers dialed by the attacbed device (Modem Service). You may configure the ports to initiate outgoing raw TCP or telnet connections to remote servers. In addition, the modem emulation feature may be enabled to allow a serial port to mimic a modem interface.

- When using tbe modem service on the port, the phone number will be translated to a bost/port pair then a TCP connection will be established to tbe remote host.
- When using outgoing connections on the port, the settings configured on the **Serial Settings** page will be applied to the port, and a TCP connection will be establisbed to the remote host.
- Once connected, data received on the port is sent to tbe remote server over the network connection and data received on the network connection is sent out the port.

**FIGURE 5. Host RJ-11 IP Gateway: Port Services**


Port Service Settings for Phone
Service Type
No Outgoing Service
Disable all outgoing services. The port can only be accessed by incoming network connections
Modem Service
Outgoing network connections are established based on phone numbers dialed by the attached device
Incoming network connections "ring" the attached device.
Outgoing Network Connection
Outgoing network connections are established based on the presence of modem signals.
Outgoing Telnet Connection
Outgoing telnet connections are established based on the presence of modem signals.
NOTE: Incoming network connections are accepted on TCP 8002.
Modem Service Options
Source TCP port for outgoing network connections
(0 for any)
0
After applying your changes, be sure to configure the required protocols for each remote peer to which you will be connecting.
Save Changes

- **No Outgoing Service:** Disables outgoing port services on tbe specified port. Incoming connections are still allowed. All port services options will reset to defaults.



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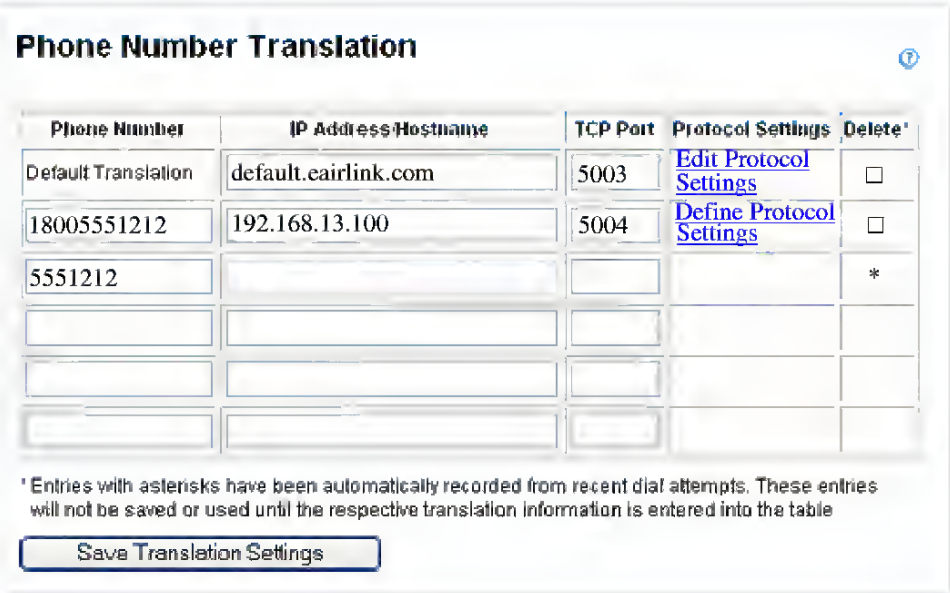
- **Modem Service:** Enables modem emulation on both tbe incoming and outgoing network connections. The target peer (specified in the Phone Number Translation table and configured in the Protocol Settings page) determines the type of outgoing connection that will be made.
- **Outgoing Network Connection:** Enables an outgoing connection to the specified host.
- **Outgoing Telnet Connection:** Enables an outgoing telnet connection to the specified host.
- **Modem Service Options:** When Modem Service is selected, you may also configure the Source TCP Port. In most cases, the value used for the source port is arbitrary and you can leave this field set to 0 for "any". However, if your server or firewall has specific requirements you may specify an explicit source port number in the Source TCP Port field. If this port is not available wben the TCP service starts up, an error will occur and the TCP service will reset and try again.

### Phone Number Translation

This table can be used to translate phone numbers into IP addresses or Hostnames. If the attached device dials one of the specified telephone numbers, the corresponding IP address and port are used to make the TCP connection. Note that all non-numeric characters except the "," (comma) in the phone number are ignored.

When modem emulation is enabled, tbe Host RJ-11 IP Gateway can detect the phone number from ATD commands. Although the IP address of the remote host can be embedded directly into the ATD command, certain devices can't always be easily configured to do this.

**FIGURE 6. Host RJ-11 IP Gateway: Phone Number Translation**




The Default Translation entry is used if the dialed phone number is not found in tbe list. (The dial backup number is not used in the Host RJ-11 IP Gateway.) The phone number table has a number of features to ease initial configuration. When an attached device dials a number that is not in the table, the device server creates a dummy entry in the table. This entry will consist of just the phone number. Until you fill in the remainder of the entry (IP Address/Hostname and Port) and save it, this entry will not be used.



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Once you have created and saved an entry in the table, a link to the associated entry on the Protocol Settings page appears on the right. If the protocol is not yet defined, this link, "Define protocol", will create a new entry on the Protocol Settings page, otherwise the link will be "Edit protocol".

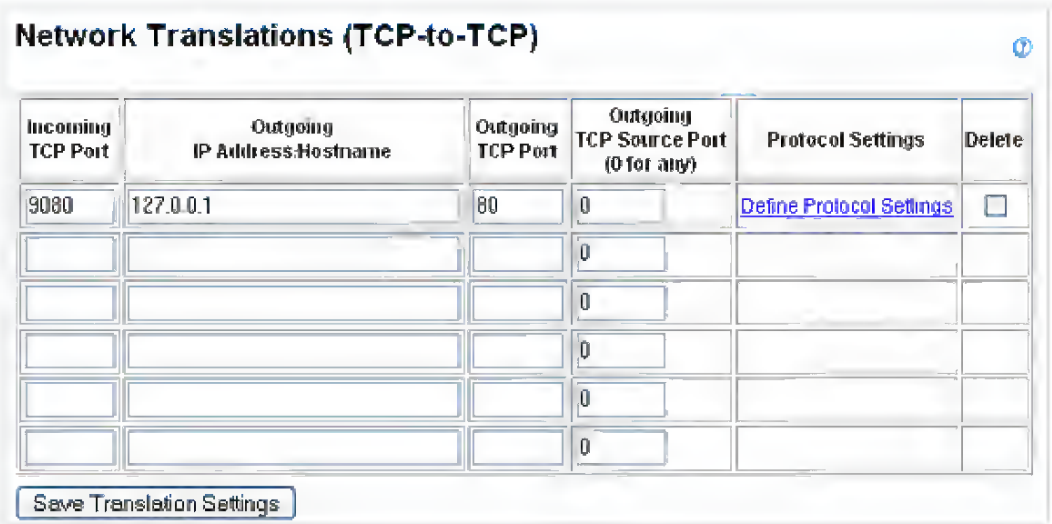
The translation table screen allows you to add up to 5 new entries at a time. A total of 64 entries may be configured including the default entry.

In the example above, if the attached device dials 18005551212, the port will be connected to the host at 192.168.13.100 on TCP port 5004. This host is not yet defined, so it will use the default TCP protocol. If the attached device dials any other number, the port will be connected to default.eairlink.com:5003, whose protocol is defined. And the terminal has actually dialed 555-1212, generating an automatic, but not yet saved, entry.

### Network Translation

The Host RJ-11 IP Gateway is capable of accepting incoming TCP connections and redirecting them to remote TCP hosts. This functionality is called network translation and behaves much like a TCP "pipe" between two systems. The Host RJ-11 IP Gateway also uses Network Translation to allow connections to tbe web-base interface on a port other than the bttp protocol defined port of 80 which is frequently blocked by cellular carriers.

**FIGURE 7. Host RJ-11 IP Gateway: Network Translation**




It is also possible to modify the network protocol traveling through the TCP pipe by using the **Protocol Settings** page to define the remote host's protocol requirements. The most common use for this functionality is to add SSL encryption to an incoming TCP connection prior to sending it along to tbe remote host.

The **Network Translation** table is used to define network mappings for TCP pipes. You must first specify the incoming TCP port to which your device or application will connect. Then, you must specify the outgoing hostname and destination TCP port for the TCP pipe.

You can also specify the source TCP port for the outgoing TCP connection. Usually, this should be set to 0 to allow automatic selection of the source port. However, if you have a firewall that



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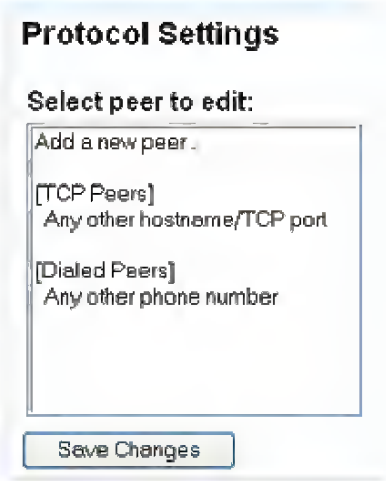
imposes limits on source TCP ports then you may need to set this to something specific. Note that if you specify something other than 0, you will be limited to only 1 TCP pipe at-a-time for any given destination port.

### Protocol Settings

For each host (peer) you will make an outgoing connection to, you need to specify the protocol options used for that host. For each host, select the Host from the "Edit settings for a different peer" selection box. Select "Add a new peer definition" link to add a new host.

**FIGURE 8. Host RJ-11 IP Gateway: Protocol Settings**




The hosts are identified by their IP address or Hostname and TCP port. You may also specify wild cards. Specific host names and/or port numbers take precedence over the wild cards. An asterisk for the IP address/hostname (for instance "*:443") means any other host when connecting on port 443. An asterisk for the port number (for instance "host.peer.com:*") refers to any other port on that host. And a double asterisk ("*:*") refers to all other hosts.

## Network Configuration

The Network Configuration group configures settings for the RJ-45 Ethernet port.

### Network Settings

The Network Settings page allows you to set the IP address, the IP netmask, and the TCP keep-alive settings.

Every IP address contains two pieces of information: the network number and the host number. A network number is assigned to each local area network and is shared by all the network devices on that network. Each network device, or "host", is assigned a unique host number. The IP netmask defines which portion of an IP address contains the network number, and which portion contains the host number. The default netmask depends on the "class" of the IP address that you are using.



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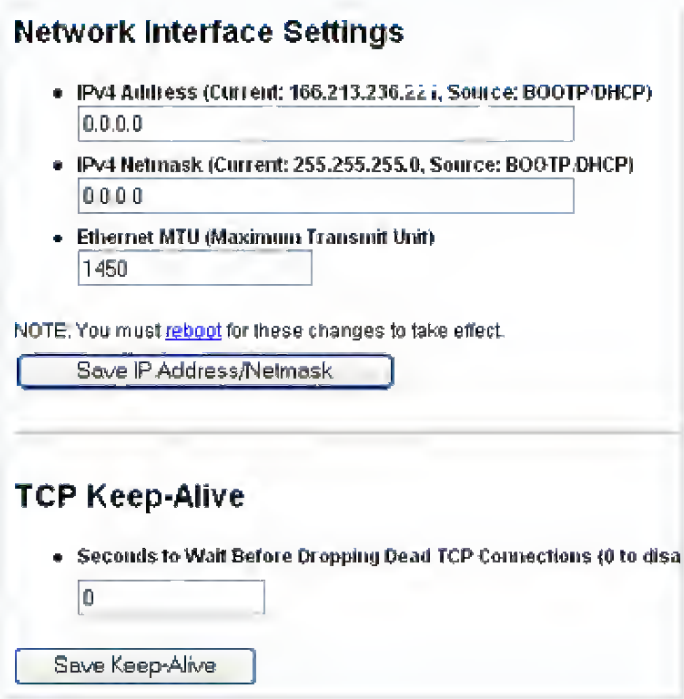
In one type of configuration, the Host RJ-11 IP Gateway bas been designed to work in conjunction with an AirLink Raven-E. The IP address for the Host RJ-11 IP Gateway and the IP address for the Raven-E need to be on the same network. If you need to set a specific IP address for the Raven-E and the Host RJ-11 IP Gateway, you will need to use Private Mode for tbe Raven-E. Setting Private Mode is covered in the Raven-E User Guide.

**FIGURE 9. Host RJ-11 IP Gateway: Network Interface Settings**


Network Interface Settings
IPv4 Address (Current: 166.213.236.22 i, Source: BOOTP/DHCP)
0.0.0.0
IPv4 Netmask (Current: 255.255.255.0, Source: BOOTP/DHCP)
0 0 0 0
Ethernet MTU (Maximum Transmit Unit)
1450
NOTE: You must reboot for these changes to take effect.
Save IP Address/Netmask
TCP Keep-Alive
Seconds to Wait Before Dropping Dead TCP Connections (0 to disa
0
Save Keep-Alive

TCP keep-alive is a standard feature of TCP/IP that can be configured to automatically monitor the state of TCP connections. If one end of an idle TCP connection is severed (like by a network or power failure), it is possible for tbe other end to remain open indefinitely. If a network host fails while it has an open TCP connection to one of the device server's serial ports, that serial port might remain unavailable until it is manually reset.

The optional TCP keep-alive feature sends special "keep-alive" packets to the remote TCP host in order to detect the situation where the remote host fails. If a failure is detected, the TCP connection is reset to allow other hosts to access the serial port.

To enable TCP keep-alives on serial-related network connections, enter the total time (in seconds) that you will allow TCP connections to remain idle before resetting them. The first keep-alive packet will be sent after the connection has been idle for half of this total time. After that, four more TCP keep-alive packets will be sent at regular intervals until a TCP response is received from the remote bost. If no response is received before the total keep-alive time runs out, the TCP connection will be reset.

**Caution:** Enabling TCP keep-alives will increase the amount of network traffic on your network. Unless you have a specific need for this feature, it is best to leave it disabled. If you do enable it, it is best to make the keep-alive time-out larger to reduce network traffic.



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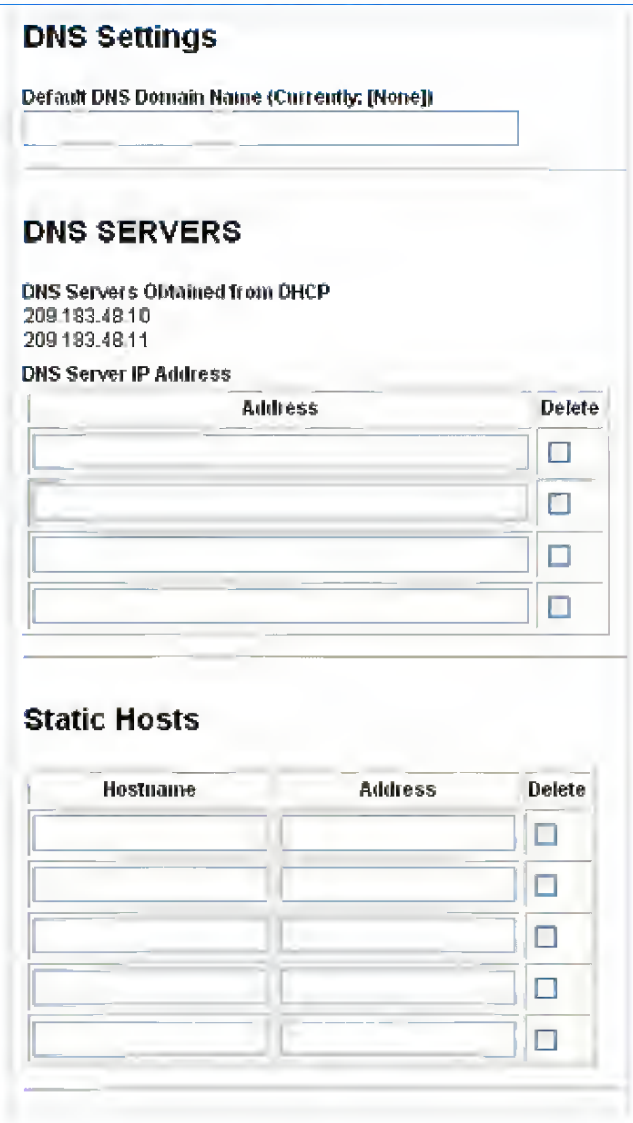
### DNS Settings

The DNS Settings page allows you to specify a DNS name for your unit, specify the addresses of DNS servers to resolve names, and to pre-define some host names. The DNS name and servers can also be derived from a DHCP server.

FIGURE 10. Host RJ-11 IP Gateway: DNS Settings




If the device server is configured to use DHCP, it will try to get DNS configuration information from the DHCP server. You may also manually set up static DNS entries on this page. Having DNS configured allows you to specify names in place of IP addresses in your configuration.

The DNS Domain Name is used as the default domain for any names you specify. For instance, if you specify the name "foo" in the ping command and the domain name "company.com" in the DNS Domain Name above, the ping command will do a DNS lookup on the name "foo.company.com".



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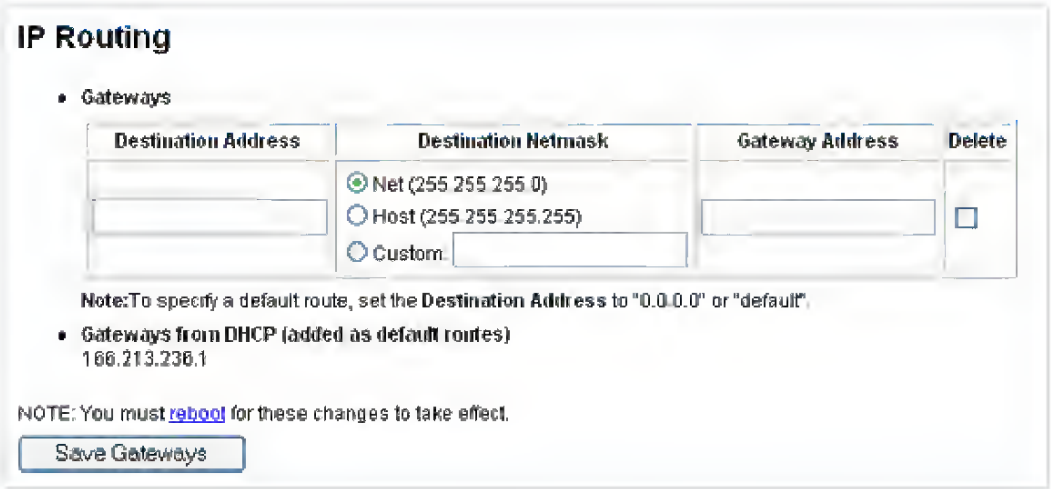
The DNS Server IP Addresses are used to specify the addresses of one or more machines that can be used to resolve names to IP addresses.

The Static Hosts entries are used to define local host name to IP address mappings.

### IP Routing

The IP Routing page lets you configure network routes for accessing remote networks.

**FIGURE 11. Host RJ-11 IP Gateway: IP Routing**




If the device server is configured to use DHCP, it will try to get IP configuration information from the DHCP server. You may also manually set up static routes on this page.

Each IP route consists of a destination IP address, a netmask, and a gateway IP address. Depending on the netmask, the destination IP can specify one of two route types:

- **Host route:** This is a route to a specific IP host. The netmask is always 255.255.255.255.
- **Network route:** This is a route to an IP network. The netmask defines which portion of the destination IP address contains the network number.

The current routing table is also displayed on this page for your reference.

### Time Settings

The Time Settings page allows you to configure NTP or HTTP time-servers to get the system time from. If you are using SSL for peer verification, the device server must obtain a valid time from an external time-server to verify the peer.

Time is used in the system and other logs. Having the correct time can help to troubleshoot problems or simply to track occurrences of particular events.

The current time is expressed in UTC (Coordinated Universal Time).



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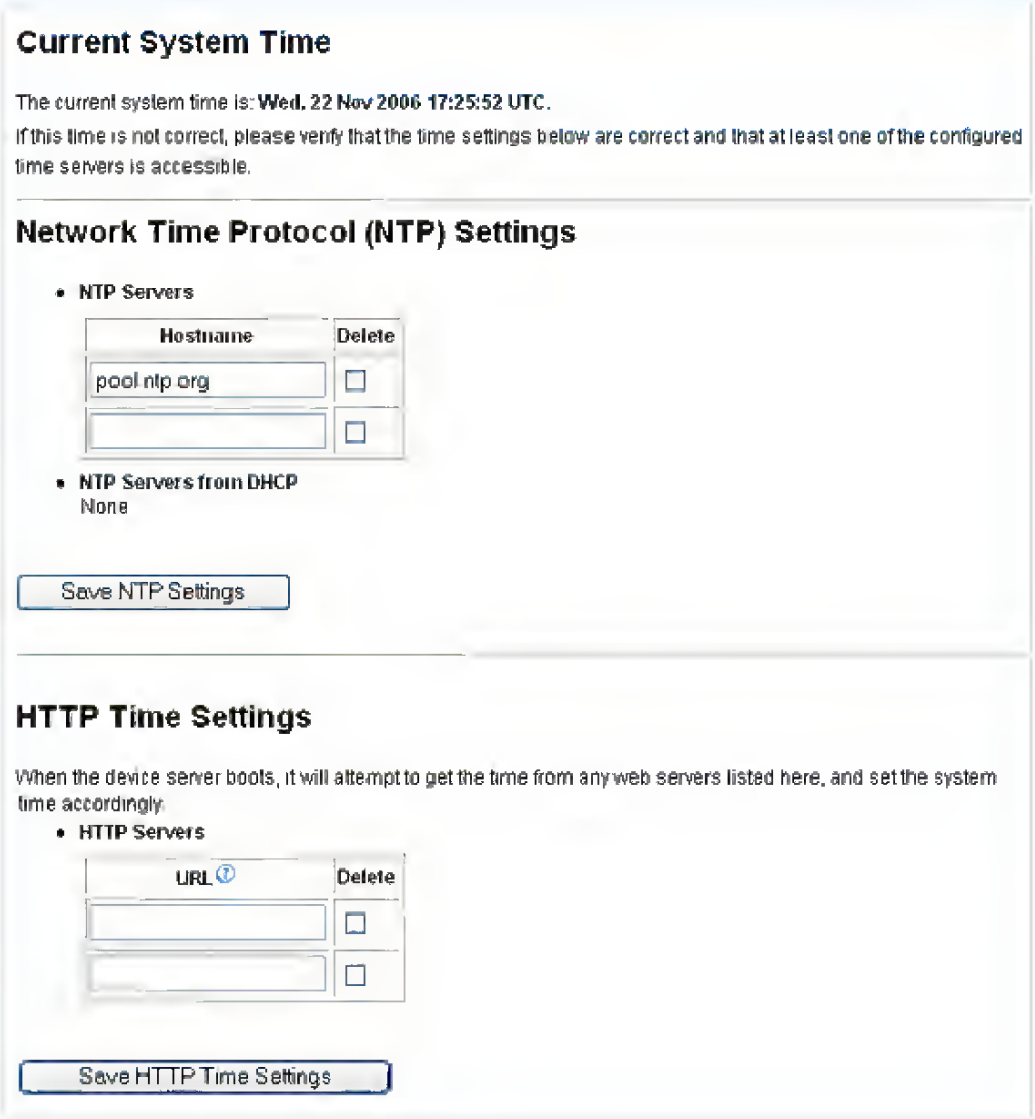
FIGURE 12. Host RJ-11 IP Gateway: Time Settings


Current System Time
The current system time is: Wed, 22 Nov 2006 17:25:52 UTC.
If this time is not correct, please verify that the time settings below are correct and that at least one of the configured time servers is accessible.
Network Time Protocol (NTP) Settings
NTP Servers
Hostname
Delete
pool.ntp.org
NTP Servers from DHCP
None
Save NTP Settings
HTTP Time Settings
When the device server boots, it will attempt to get the time from any web servers listed here, and set the system time accordingly.
HTTP Servers
URL
Delete
Save HTTP Time Settings

If the device server is configured to use DHCP, it will try to get NTP server information from the DHCP server. You may also manually set up the addresses on this page. The NTP service uses UDP port 123. If your device server is behind a firewall you may need to allow accesses to this port through the firewall. Adding or changing the NTP server will trigger the Host RJ-11 IP Gateway to get the time again.

The HTTP server you specify need not be a designated time server – just a reliable server. The device server derives the system time from the HTTP header the server returns. Adding an HTTP server will not automatically trigger getting the time. You must reboot for this to take effect.

### Security Settings

The security settings page includes settings for the System Password and Network Isolation.



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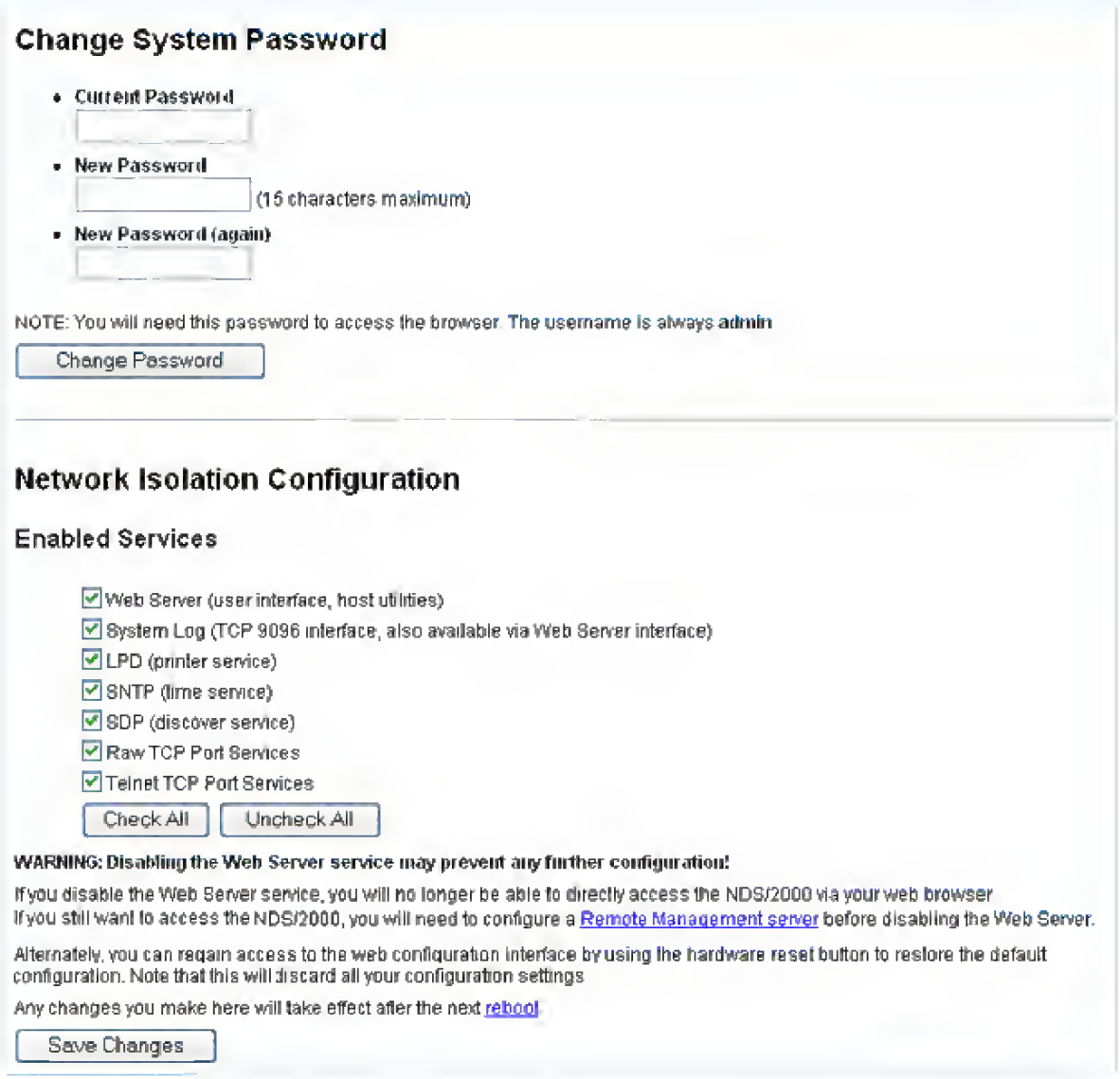
FIGURE 13. Host RJ-11 IP Gateway: Security Settings


Change System Password
Current Password
New Password
(15 characters maximum)
New Password (again)
NOTE: You will need this password to access the browser. The username is always admin
Change Password
Network Isolation Configuration
Enabled Services
Web Server (user interface, host utilities)
System Log (TCP 9096 interface, also available via Web Server interface)
LPD (printer service)
SNTP (time service)
SDP (discover service)
Raw TCP Port Services
Telnet TCP Port Services
Check All
Uncheck All
WARNING: Disabling the Web Server service may prevent any further configuration!
If you disable the Web Server service, you will no longer be able to directly access the NDS/2000 via your web browser
If you still want to access the NDS/2000, you will need to configure a Remote Management server before disabling the Web Server.
Alternately, you can regain access to the web configuration interface by using the hardware reset button to restore the default configuration. Note that this will discard all your configuration settings
Any changes you make here will take effect after the next reboot
Save Changes

- **System Password:** The Host RJ-11 IP Gateway's administrative functions can be protected by a system password.

  By default, no system password is configured. Once a password is set, your web browser will prompt you for the system password whenever you try to access sensitive configuration pages. The browser will ask for a username and password. The username is always "admin". The password will be what you configured.

- **Network Isolation Configuration:** By default, all network services are enabled. However, for security, any or all listening services may be disabled. Unselect any services that you wish to disable. These changes will not take effect until the next reboot.



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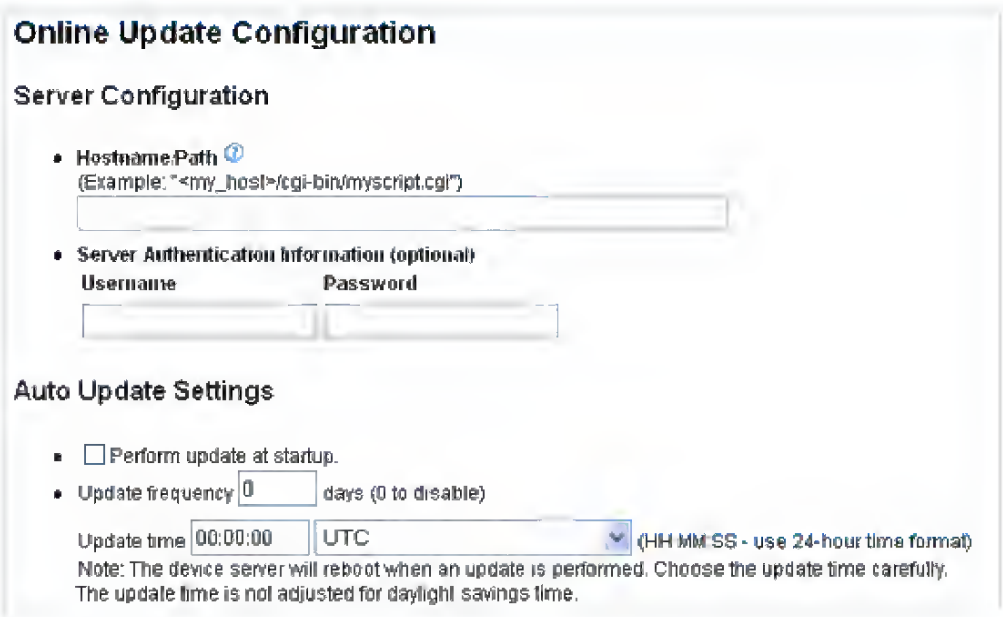
### Online Update

You may configure your device server to make a connection to an update server and obtain updated software or configuration information from the server or send information to the server.

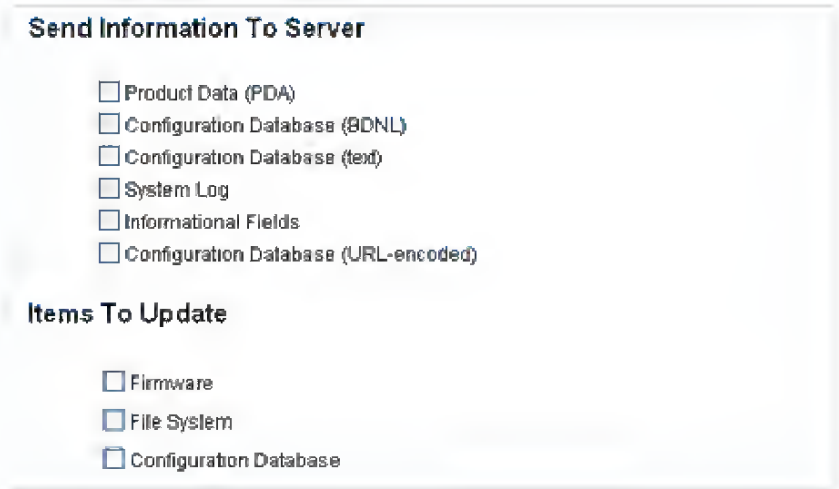
**FIGURE 14. Host RJ-11 IP Gateway: Online Update -top half of the page P**


Online Update Configuration
Server Configuration
Hostname/Path
(Example: "<my_host>/cgi-bin/myscript.cgi")
Server Authentication Information (optional)
Username
Password
Auto Update Settings
Perform update at startup.
Update frequency 0 days (0 to disable)
Update time 00:00:00 UTC (HH MM SS - use 24-hour time format)
Note: The device server will reboot when an update is performed. Choose the update time carefully.
The update time is not adjusted for daylight savings time.

To configure updates, first, select the update server to use and the SSL parameters for connecting to it. You may specify both the server name and the path for obtaining the updates. If the server requires HTTP authentication from the device server, specify the username and password to use.

You can schedule the updates to happen periodically, or on every startup, or only when manually selected. The automatic update capability can be used along with Network Isolation to provide a way for the device server to "call out" to get updates if all the incoming connections are disabled.

**FIGURE 15. Host RJ-11 IP Gateway: Online Update - middle of the page**



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You can configure which items to send to the server or update from the server.

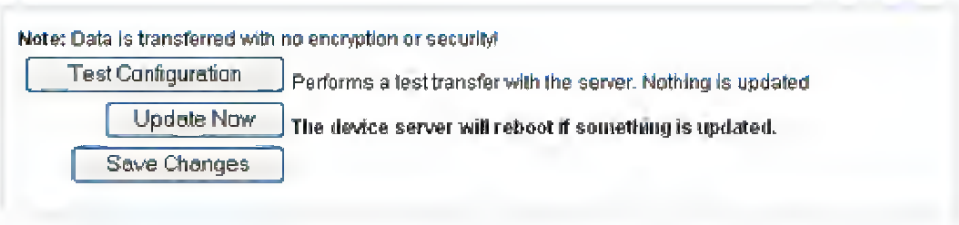
Items to send:

- Product Data – manufacturing configuration data, error records
- Configuration Database – current settings on the unit
- System Log – trace activity

Items to Upload:

- Operating Software – the software running in the unit
- File System – SSL certificates
- Current Configuration – current settings on the unit

**FIGURE 16. Host RJ-11 IP Gateway: Online Update - bottom of the page**


Note: Data is transferred with no encryption or security!
Test Configuration
Performs a test transfer with the server. Nothing is updated
Update Now
The device server will reboot if something is updated.
Save Changes

- Test Configuration – check to make sure the settings are right and the server is available. This will contact the server and go through the communication necessary to send and receive the files without actually doing so.
- Update Now – contacts the server and sends and updates the files now.
- Save Changes – save changes for later.

## Status and Logs

The status and log pages display system and operation information.

### Troubleshooting

Significant events will be displayed for review. For a more complete report of events, see the system log.



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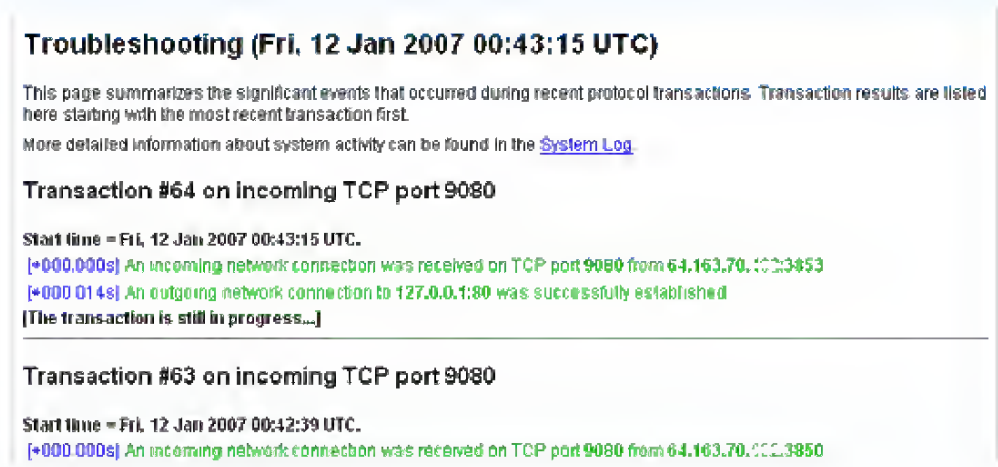
FIGURE 17. Host RJ-11 IP Gateway: Troublesbooting

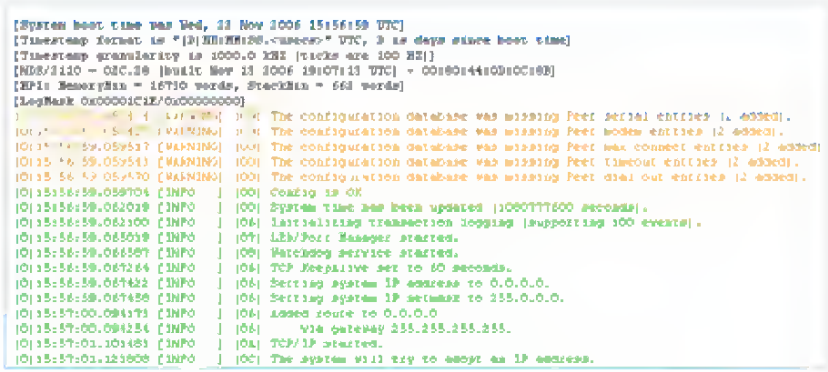

Troubleshooting (Fri, 12 Jan 2007 00:43:15 UTC)
This page summarizes the significant events that occurred during recent protocol transactions. Transaction results are listed here starting with the most recent transaction first.
More detailed information about system activity can be found in the System Log.
Transaction #64 on incoming TCP port 9080
Start time = Fri, 12 Jan 2007 00:43:15 UTC.
[+000.000s] An incoming network connection was received on TCP port 9080 from 64.163.70.
[+000.014s] An outgoing network connection to 127.0.0.1:80 was successfully established
[The transaction is still in progress...]
Transaction #63 on incoming TCP port 9080
Start time = Fri, 12 Jan 2007 00:42:39 UTC.
[+000.000s] An incoming network connection was received on TCP port 9080 from 64.163.70.

## System Log

By default, the device server stores informational and error messages in the system log. You can also configure the device server to record debug trace data in this system log buffer (See "Log Files and Settings" on page 35.). The log file is displayed with color-coding to make it easier to spot specific entries.

You can save the System Log to a file to review separately. You can also clear the log, but there is no confirmation on clearing the stored log file.

FIGURE 18. Host RJ-11 IP Gateway: System Log


[System boot time was Wed, 22 Nov 2006 15:56:59 UTC]
[Timestamp format is "[D]HH:MM:SS.<usecs>" UTC, D is days since boot time]
[Timestamp granularity is 1000.0 KHZ (ticks are 100 NS)]
[NDS/2110 - 02C.28 (built Nov 13 2006 19:07:13 UTC) - 00:80:a3:4c:0b:0c:e8]
[RPIs MemoryMin = 16730 words, StackMin = 662 words]
[LogMark 0x00001C1E/0x00000000]
|0|15:56:59.059704 [INFO ] |00| Config is OK
|0|15:56:59.062018 [INFO ] |00| System time has been updated |1000777600 seconds|.
|0|15:56:59.062100 [INFO ] |06| Initializing transaction logging (supporting 100 events).
|0|15:56:59.065018 [INFO ] |07| LED/Port Manager started.
|0|15:56:59.065507 [INFO ] |08| Watchdog service started.
|0|15:56:59.067264 [INFO ] |06| TCP Keepalive set to 60 seconds.
|0|15:56:59.067422 [INFO ] |06| Setting system IP address to 0.0.0.0.
|0|15:56:59.067458 [INFO ] |06| Setting system IP netmask to 255.0.0.0.
|0|15:57:00.084171 [INFO ] |06| Added route to 0.0.0.0
|0|15:57:00.084254 [INFO ] |06|     via gateway 255.255.255.255.
|0|15:57:01.103481 [INFO ] |04| TCP/IP started.
|0|15:57:01.121808 [INFO ] |0C| The system will try to accpt an IP address.

## Port Status

The current status of the RJ-11 port is displayed.



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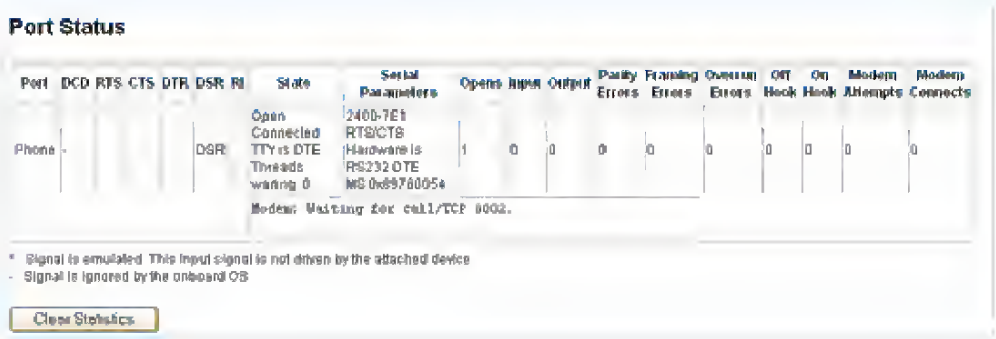
FIGURE 19. **Host RJ-11 IP Gateway: Port Status**


Port Status
Port DCD RTS CTS DTR DSR RI State Serial Parameters Opens Input Output Parity Errors Framing Errors Overrun Errors Off Hook On Hook Modem Attempts Modem Connects
Phone DSR Open Connected TTY is DTE Threads waiting 0 2400-7E1 RTS/CTS Hardware is RS232 DTE MS 0x89780054 1 0 0 0 0 0 0 0 0 0
Modem: Waiting for call/TCP 8002.
* Signal is emulated. This input signal is not driven by the attached device
- Signal is ignored by the onboard OS
Clear Statistics

The DCD, RTS, CTS, DTR, DSR, and RI columns indicate the status of the modem signals for the RJ-11 (phone) port. If the modem signal is present (either asserted if it is an outgoing signal, or detected if it is an incoming signal) its name will appear in the corresponding column.

The State column indicates whether the port is open, closed, waiting for DCD, or experiencing any notable conditions (such as flow control). The Serial Parameters column indicates the current settings for the port.

**Note:** The Serial Parameters column reflect the actual, real-time serial settings in use by the port. The settings that are specified via the serial configuration pages are applied each time the port is opened. If the port is closed, the serial parameters reported by Port Status may not necessarily match the settings you configured until the port is re-opened. Furthermore, some clients (like NativeCOM) can override the configured settings.

The Input, Output, Parity Errors, Framing Errors, and Overrun Errors columns are tallies of activity on the port. Under each port row is a field indicating the current TCP connection status on the port.

The display will update automatically every few seconds. You can stop the automatic update by selecting “Stop” from your browser. To restart the updating, select “Refresh” or “Reload” from your browser.

### OS and Network Information

The OS Information shows the current state of system and application tasks as well as memory usage information.

The Network Information displays the status of network services and current connections. The TCP Sockets section shows current connections and TCP listeners. The UDP Listeners section shows UDP ports that are active.

The Network Interfaces displays the status of the currently active interfaces on the unit. This is similar to the “ipconfig” command on a Windows machine or the “ifconfig” command on a Unix machine. The current routing table is displayed as well.



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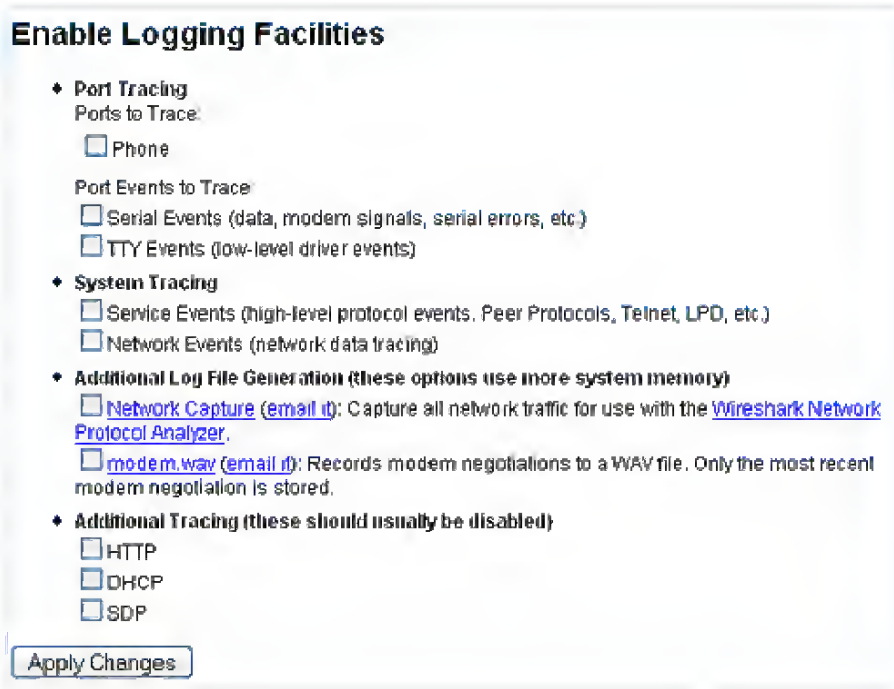
### Log Files and Settings

This page has two parts, Enabling Logging (Log settings) and Emailing Debug information.

By default, the Host RJ-11 IP Gateway stores informational and warning messages in the system log. You can also configure the Host RJ-11 IP Gateway to save trace data in this system log buffer.

**FIGURE 20. Host RJ-11 IP Gateway: Log Settings**


Enable Logging Facilities
Port Tracing
Ports to Trace
Phone
Port Events to Trace
Serial Events (data, modem signals, serial errors, etc.)
TTY Events (low-level driver events)
System Tracing
Service Events (high-level protocol events. Peer Protocols, Telnet, LPD, etc.)
Network Events (network data tracing)
Additional Log File Generation (these options use more system memory)
Network Capture (email it): Capture all network traffic for use with the Wireshark Network Protocol Analyzer.
modem.wav (email it): Records modem negotiations to a WAV file. Only the most recent modem negotiation is stored.
Additional Tracing (these should usually be disabled)
HTTP
DHCP
SDP
Apply Changes

Tracing is generally used for troublesbooting problems. For port tracing, you must select both the port (phone) and the events that you want to trace.

You can also select additional log file generation, either a log file for the Ethereal Network Protocol Analyzer or a WAV file for later analysis. Selecting "modem.wav" will record the latest modem negotiation from the RJ-11 port (from the time it dials until it completes negotiation).

For the additional log file generation, you will need to specify an email address for the recipient as well as your own email information.



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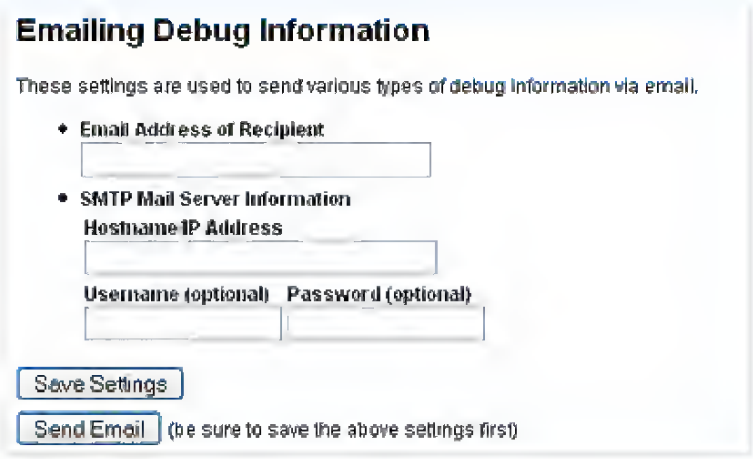
FIGURE 21. **Host RJ-11 IP Gateway: Emailing Debug Information**


Emailing Debug Information
These settings are used to send various types of debug information via email.
Email Address of Recipient
SMTP Mail Server Information
Hostname/IP Address
Username (optional)
Password (optional)
Save Settings
Send Email
(be sure to save the above settings first)

The SMTP Server Information is the SMTP (mail host) you will be using to send the debug information. You can usually find the SMTP settings in the email client you use. Not all email hosts will allow relaying through their host.

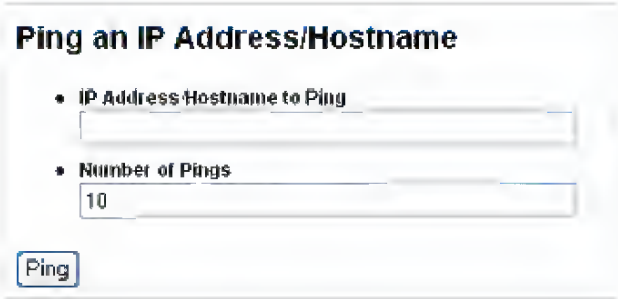
## Commands

The Host RJ-11 IP Gateway has some built in commands available.

### Ping

You can use the Ping command to test a network connection.

FIGURE 22. **Host RJ-11 IP Gateway: Ping**




Enter the IP address to Ping or a Hostname and the Number of Pings then press the Ping button. The command will display the results as follows:

```
Sending 10 PINGs to 209.75.217.6...
Response from 209.75.217.6: icmp_seq=0, time=10.0 ms
Response from 209.75.217.6: icmp_seq=1, time=10.0 ms
Response from 209.75.217.6: icmp_seq=2, time=10.0 ms
Response from 209.75.217.6: icmp_seq=3, time=10.0 ms
Response from 209.75.217.6: icmp_seq=4, time=10.0 ms
Response from 209.75.217.6: icmp_seq=5, time=10.0 ms
```



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```
Response from 209.75.217.6: icmp_seq=6, time=10.0 ms
Response from 209.75.217.6: icmp_seq=7, time=10.0 ms
Response from 209.75.217.6: icmp_seq=8, time=10.0 ms
Response from 209.75.217.6: icmp_seq=9, time=10.0 ms
10 packet(s) transmitted, 10 packet(s) received, 0% packet loss
```

Not all hosts accept ICMP pings even if they are present on the network. However, the ping command can serve two functions: 1) to test your general network settings – IP address, network mask, gateway and DNS server and 2) whether the device server can reach a given host. Simply resolving a name to an IP address effectively tests the first function.

**Note:** Some cellular carriers block ICMP pings on their cellular network.

### Reset/Reboot

The Reset/Reboot page lets you reset the phone (RJ-11) port or the entire Host RJ-11 IP Gateway.

**FIGURE 23. Host RJ-11 IP Gateway: Reset/Reboot**

You can reset the phone port by selecting the port and pressing the Reset Port(s) button. This will kill whatever service was on the port and reset it back to the current configuration settings.

You may reboot the entire device by pressing the Reboot button. This is the equivalent of power cycling the unit.



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APPENDIX A

# Specifications

## Physical Dimensions

- 6.6 inches x 2.5 inches x 1.2 inches (168 mm x 64 mm x 30 mm)
- 4.8 ounces (136 grams)
- External 110 to 240 VAC power supply: +7VDC to +36VDC - 300mA at 12V (3.6W)

1. Phone Port: RJ-11
2. Ethernet Port: RJ-45 auto-sensing 10base-T
3. LEDs: Status, Ethernet, Phone

## Connections

- Supports generic (raw) TCP/IP access to phone port without requiring special protocols or processing

**Caution:** The Host RJ-11 IP Gateway's RJ-11 phone port should never be connected into the Public Switched Telephone Network (PSTN). This device is designed to emulate the PSTN for other devices.
The Host RJ-11 IP Gateway may sustain damage not covered by warranty if it is connected to the Public Switched Telephone Network.

## Phone and Modem standards

- Bell 212A
- ITU-T V.22
- ITU-T V.22bis
- V.22 FastConnect (Hypercom)

## Environmental

- Operating temperature range: -30 to 70°C
- Storage temperature range: -30 to 70°C
- Humidity range: 10% to 90% non-condensing



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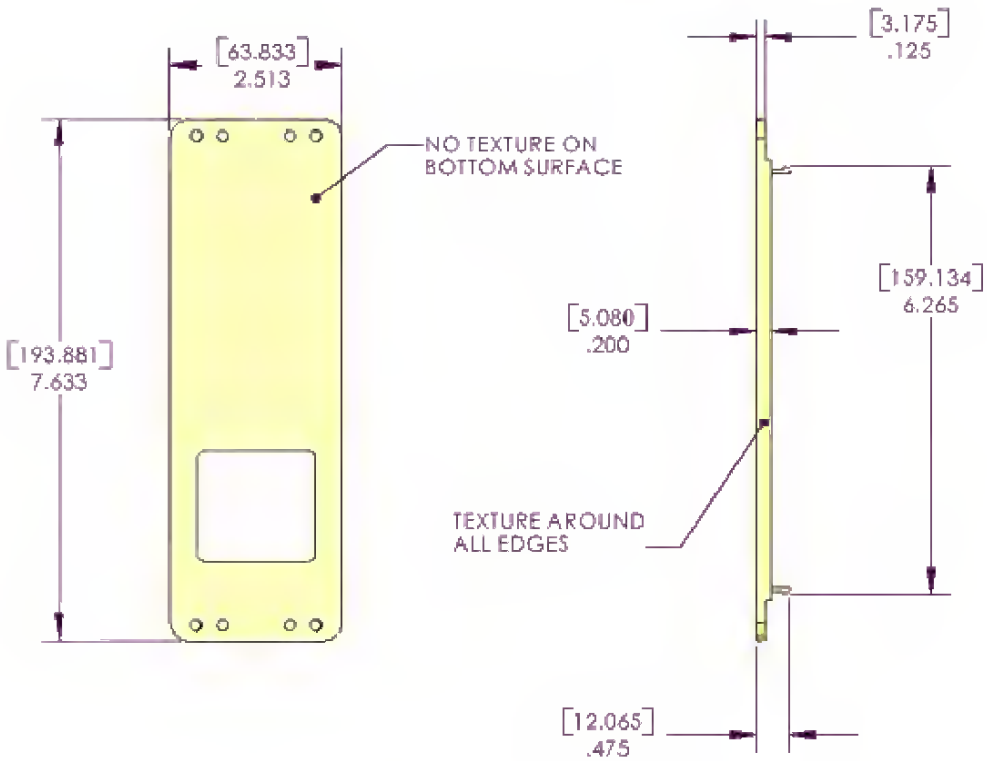
## Optional Mounting Bracket

The mounting bracket is designed to "snap" on to the back of the Host RJ-11 IP Gateway for easy installation.

**FIGURE 1. Mounting Bracket, part number 100-170-1010**



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APPENDIX B

# AT Commands

In addition to the web-based interface, you can use some typed AT Commands with the Host RJ-11 IP Gateway. To enter AT commands, you need to be connected to the device via telnet or by using the RJ-11 port as you would a standard analog modem.

All AT command strings, with the exception of the break sequence ("+++") and the repeat command ("A/"), must be terminated with the command line termination character, defined in S3 (default is CR). All characters before 'AT' are ignored. Unsupported commands are ignored and generate an "OK" result code. Multiple commands may be combined on a single line, however the AT command string is currently limited to 40 characters.

Example: **AT&FE0V0**

| Command | Function | Response |
|---|---|---|
| / | Repeat last command | Varies<br>Note: Command executes upon "/" character, CR not needed. |
| <blank> | Attention | OK(0) |
| A | Answer | OK(0), NO CARRIER(3) |
| D | Dial | CONNECT(1), NO CARRIER(3)<br>If suffixed with ";" character, will return to command mode upon connection. |
| En | Echo Mode<br>0=Turn command echo off<br>1=Turn command echo on (default) | OK(0) |
| Hn | Hang-up or Terminate connection.<br>Optional argument has no function | OK(0) |
| In | Information<br>0=Serial Port Speed<br>3= Model and Version | Varies<br>Actual value equals current port speed<br>NDS/5102 (2 Port, RJ-45) v01A |
| O | Return to data mode from command mode | |
| Qn | Result Codes<br>0=Enable result codes (default)<br>1=Supress result codes | <br>OK(0)<br><blank> |



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| Command | Function | Response |
|---|---|---|
| Sn=mm<br>Sn? | Set register to specified value (page 42)<br>Return current value formatted as 3 digit decimal | OK(0)<br>Varies |
| Vn | Result Code Format<br>0=Numerical result codes<br>1=Verbose result codes (default) | <br>0<br>OK |
| Xn | Result Code Format<br>0="CONNECT" upon entering online data state<br>1-4="CONNECT <text>" upon entering online data state | OK(0) |
| Zn | Load factory default settings | OK(0) |
| &Cn | DCD Control<br>0=DCD always on<br>1=DCD follows connection status | OK(0) |
| &Dn | DTR Control<br>0=ignore<br>1=loss of DTR switches to command mode and leaves connection open<br>2=loss of DTR switches to command mode and closes connection (default) | OK(0) |
| &F<br>&Fn | Load factory default settings | OK(0)<br>Equivalent to ATZ without dropping the connection. This command does not affect the flash configuration for the port. |
| &V<br>&V0 | Display S-register values | Example:<br>E0 Q1 V0 &C1 &D2<br>S00:002 S02:043 S03:013 S04:010 S05:008 |
| &V1 | Status | Returns reason for the last disconnect:<br>TERMINATION REASON.....DTR LOSS<br>TERMINATION REASON....CARRIER LOSS |
| &W<br>&W1 | Write current configuration to flash | OK(0) |
| &Xnnn | Change baud rate.<br>nnn Baud<br>3 300<br>12 1,200<br>24 2,400<br>48 4,800<br>96 9,600<br>14 14,400 | OK(0) |
| &X | Any other & command is ignored | OK(0) |



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| Command | Function | Response |
|---|---|---|
| %X | Any % command is ignored | OK(0) |
| +X | Any + command is ignored | OK(0) |
| $Xn | Any $ command is ignored including 0 or more digits after the command. | OK(0) |

### *S-Registers*

S Registers are 1 byte, volatile registers used to store configuration data. They are reset to the default state whenever modem emulation is enabled, or the ATZ/AT&F command is received. They can be saved to flash memory with the AT&W command. When the port is opened, the saved parameters are applied to the port.

| Register | Contents | Default |
|---|---|---|
| S0 | Automatic Answer(# of RING's) | 0 (disabled) |
| S1 | Number of RING's Received | 0 |
| S3 | Command Line Termination Character | CR(13) |
| S4 | Response Formatting Character | LF(10) |
| S5 | Command Line Editing Character | BS(08) |
| S12 | Guard time on either side of the +++ sequence to break into command mode. Specified in 50ths of a second. | 50 |

## Response Codes

| Result Code (ATV1) | Numeric (ATV0) | Reason |
|---|---|---|
| OK | 0 | Command Successful |
| CONNECT | 1 | Connection Established |
| RING | 2 | Incoming connection awaiting answer |
| NO CARRIER | 3 | Connection Terminated |
| ERROR | 4 | Error in AT command string |
| CONNECT 1200 | 5 | Connected – Serial Port Speed is 1200 baud |
| NO DIALTONE | 6 | Not Used |
| BUSY | 7 | Not Used |
| NO ANSWER | 8 | Not Used |
| CONNECT 2400 | 10 | Connected – Serial Port Speed is 2400 baud |
| CONNECT 4800 | 11 | Connected – Serial Port Speed is 4800 baud |
| CONNECT 9600 | 12 | Connected – Serial Port Speed is 9600 baud |
| CONNECT 14400 | 13 | Connected – Serial Port Speed is 14400 haud |



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## Modem Signal Behavior

The RJ-11 IP Gateway is not a modem (DCE), but is a terminal (DTE) device. It is designed to be connected to another DTE device via RJ-11 cable.The RI (Ring Indicator) signal does not have a corresponding outgoing signal so it is not supported.

Specifically, the DTR, DSR and DCD signals should be crossed with tbe device as follows:

| Device | RJ-11 IP Gateway |
|---|---|
| DCD,DSR | DTR |
| DTR | DCD,DSR |

To emulate a modem properly, the Host RJ-11 IP Gateway does the following:

| Mode | Modem DCD Settings | Behavior |
|---|---|---|
| Command/Data | Always on (&C0) | DTR is asserted |
| Command/Data | Follow connection (&C1) | DTR is asserted only when TCP/IP connection is present and has been accepted via ATA or auto-answer. DTR is de-asserted when connection is lost |

The device server monitors its DCD signal in order to detect changes in the device's DTR signal. The following behaviors occur on loss of DCD only.

| Mode | Modem DTR Settings | Response to loss of DCD |
|---|---|---|
| Offline | AT&D0 | Ignore |
| Offline | AT&D1 | Ignore |
| Offline | AT&D2 | Ignore |
| Online | AT&D0 | Ignore |
| Online | AT&D1 | Drop to command mode, preserving connection |
| Online | AT&D2 | Drop to command mode, terminating any connection |

## Phone Numbers

The "phone number" used in an outgoing connection for an "ATD" command may be a real phone number that is translated to an IP/port pair (see Phone Number Translation) or it consists of an IP address and optional port number. All leading non-numeric characters (such as the T or P dial modifiers) are ignored. A number of formats are accepted for the "IP" phone number.

| Format | Example | Notes |
|---|---|---|
| Dotted decimal | a.b.c.d or 192.168.1.1 | Numbers are from 0 to 255 |
| Comma decimal | a,b,c,d or 192,168,1,1 | For programs that don't allow dots in phone numbers |



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| Format | Example | Notes |
|---|---|---|
| Fixed format | aaabbbcccddd or 192168001001 | 12 digit IP address, each number is three decimal digits with leading zeroes |
| Optional port number | :xxxxx | Decimal TCP port number from 0..65535 |

- If no phone number (IP address) is specified, the Destination IP Address configured for the port is used.
- If no port number is specified, the Destination TCP Port configured for the port is used.
- The source port for the TCP connection follows the Source TCP Port configured for the port.

## Port Settings

Most of the serial port settings (like baud rate) are controlled by the configured port settings on the device server. Modem emulation does not support changing these from AT commands.



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APPENDIX C

# Warranty Terms and Conditions

The following terms and conditions ("Warranty Terms") govern the warranty services offered to you ("Customer") by AIRLINK COMMUNICATIONS, INC. ("AirLink"), located at 3159 Corporate Place, Hayward, CA 94545, in connection with the sale and licensing of AirLink software and hardware.

## Standard Software Warranty

AirLink warrants that the AirLink software ("Software") licensed hereunder will perform in substantial conformance to the applicable AirLink software specifications during the warranty period. Tbe warranty period is ninety (90) days from the date of delivery of the Software to Customer. AirLink's sole obligation with respect to this express warranty shall be, at AirLink's option, to refund the license fee paid by Customer for any defective Software or to replace the Software with Software tbat substantially conforms to AirLink's applicable software specifications.

## One Year Standard Equipment Warranty

For a period of one year from delivery, AirLink warrants that the hardware products ("Hardware") will meet AirLink's standard specifications and will be free from defects in materials and workmanship.

## Remedy

If under normal use the Software and/or Hardware (collectively, the "Products") prove to have any such defect and the Customer notifies AirLink of such defect within the warranty period, AirLink, at its option, will either repair or replace the same without charge. The warranty does not apply if the serial number label or any warranty voiding label has been removed or if the Product has been subjected to physical abuse, improper installation, or modification not authorized by AirLink, or if the Product was used in a manner for which it was not intended. Products will be accepted for repair or replacement upon written authorization and in accordance with instructions of AirLink. Customer will obtain a Return Material Authorization ("RMA") number from AirLink's Customer Support, fill out an RMA submission form, and enclose it with the product. Transportation expenses associated with returning such Products to AirLink will be borne by Customer. AirLink will pay the costs of return transportation of the repaired or replaced Products. Please contact AirLink's support group via email at support@airlink.com or telephone at 510-781-9760 to obtain an RMA number. Products deemed by AirLink to be DOA (dead on arrival) may be returned to AirLink for repair, at AirLink's expense, using the standard RMA procedures.



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APPENDIX D

# AirLink Technical Support

If you encounter problems with operation of your Host RJ-11 IP Gateway or Raven-E (as applicable), AirLink's support staff can help.

## AirLink Support Web Site

The AirLink web site is updated frequently with Setup Wizards, Utilities, How-To Guides, and other documentation: http://www.airlink.com/support.

## AirLink Documentation and Guides

- **Modem User Guides** - These guides are specific to your modem type, cellular provider, and cellular technology and contain comprehensive information about the operation of the modem and its features.
- **Modem Quick Start guides** - These guides are also specific to the modem type, cellular provider, and cellular technology and are a step by step guide to activating the modem using the Setup Wizard or other steps as applicable.
- **Utility Guides** - These guides focus on the features of one of the AirLink modem utilities: Wireless Ace, AceView, AceNet, Modem Doctor, etc.
- **Application Notes** and **How-To Guides** - These guides detail configuring the modem to work with a specific feature set or how the modem can be set up to work with a specific 3rd party (non-AirLink) device.
- **Data Sheets** and **White Papers** - These are technology based information documents.

## Contacting Technical Support

For support assistance please email support@airlink.com or call 510-781-9760 Monday through Friday 5 AM to 5 PM Pacific Time (8 AM to 8 PM Eastern Time). Support is not available weekends or holidays.



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